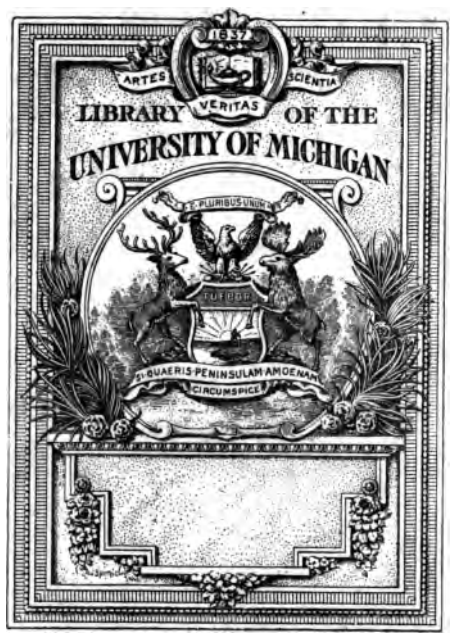
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CLASSIFICATION.

CLASSIFICATION

THEORECTICAL AND PRACTICAL

Together with an Appendix containing an Essay towards
a Bibliographical History of System of Classification

BY

ERNEST CUSHING RICHARDSON

Librarian of Princeton University

The New York State Library School Association
Alumni Lectures, 1900-1901
Reprinted with additions

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PREFACE TO THE REPRINT.

THESE lectures have been now for several years out of print. In the meantime there has been a small but persistent demand, and lately there have been several requests for a reprint. The author has hesitated to re-issue without re-editing, but it has proved impossible to find time for this, and the matter is reprinted unchanged, except for the somewhat considerable additions. No attempt has been made through this additional matter to bring up to date with the exhaustiveness attempted in the original edition, but most of the more representative and striking systems, both theoretical and practical, have been added and a certain amount of bibliographical reference has been given for the orientation of the reader who wishes to be more exhaustive.

If there were time for re-editing, the author might alter his former language a little in deference to the feelings of logicians and metaphysicians, and he would have again to revise the use of the words "corpuscles", "ions", and "electrons", but in essence there is little that he would care to change. It is true that psychologists have tended of late years still more to the notion that classification is one of subjects rather than of objects, but the author is still more of the conviction that this is a profound theoretical and practical mistake, leading to endless confusion. He sees no reason to modify the main propositions; (1) That the order of classification is the order of objects, (2) That this order forms a series of growing complexity from the simplest to the most complex, (3) That this order is at the same time the logical, chronological and generally, the genealogical order, (4) That this order concerns the subhuman, the human, and the superhuman, (5) That the human has to do with, (a) ideas of natural objects (images of things that are or have been, including human and superhuman objects) and (b) ideas of artificial objects (images of objects produced or modified by the human mind or which represent objects having no counterpart in the outer world except as figures of what might be), (6) That practical classification is the putting together of books most used together, (7) That in case of conflict in book classification the practical always prevails over the theoretical.

A word may be added as to theology, which was, perhaps, touched too lightly for clearness in the first edition—in the effort to spare prejudices. The point of view of these lectures implies that

superhuman beings, if there be such, are real objects or parts of the real universe, to be examined by the methods of science and interpreted by its laws. The logical implication from this is the strict agnostic position that, the mind of man being of the nature that it is, God cannot be known save through real objects. The logic of this in turn is, first, the doctrine of deism, that the unseen God is known only through the objective universe, and that He is not and cannot be immediately revealed to man. This again leads to the doctrine that the universe is God (Pantheism), or is pervaded by God (Immanence). This suggests in turn the doctrine of the divine word "incarnate" or the putting of the Divine Person into objective knowable substance, as the only way of revealing the (otherwise) unknowable God to mental man. This doctrine of the Word Incarnate, shared by Sumerians, Egyptians, Indians, Persians, Greeks and Scandinavians at least, seems, when joined with the doctrine of evolution, to lead to the hypothesis that the objective, knowable God, who is the universe, in His self evolution, came, or will come, to some spot in space and time where and when, His Self, or complete idea-complex of images, feelings and purposes, as to things past, present and to come, is itself made real or "immanent" and enters the objective universe of knowable realities. This again, in short, is the "Person incarnate" who in the Christian system is, by hypothesis, the historical person Jesus Christ, the Head or Self or Person, the brains, heart and will of the universe (subhuman as well as human) which forms his body. Whether this hypothesis that the Person of God took on knowable substance in the historical person Jesus Christ points to a fact, or not, is a question outside the field of a book on classification. For the purpose of this book it is enough that this theory seems to be the only one which even attempts to explain the universe as a whole. It may be said, however, in passing, that the hypothesis seems at least to answer to the ancient test of "truth," now rephrased by Pragmatism—it works, so far, for someone.

The additions to the reprint include: (1) Some account of sixteen additional theoretical systems and extended account of four new library systems, with a few references to new editions of the older systems, (2) Fourteen additional titles under *Literature* (3) Notes for orientation under Literature, Theoretical systems, Practical (library) systems.

The theoretical systems are: (1843) Duval-Jouve, (1881) De Roberty, (1886-7) (Masaryk), (1893) De la Grasserie, (1897) Janet, (1898) Hoffman, (1898) Cogswell, (1899) Meyer, (1899) Trivero,

(1903) Whittaker, (1904) Münsterberg, (1904) Raya, (1906) Stumpf, (1907) Le Dantec, (1909) Froument, (1910) Barthel. The practical systems are: (1904 or 1901 sq.) Library of Congress, (1905) Brussels Institut, (1906) Brown's Subject Classification, (1910) Bliss. The new titles under Literature are: Bostwick, Brown (Guide, Manual and Small library), Cannons, Dana, Delisle, Flint, Focke, Martel, Morel, Purnell, Rider, Taylor.

ERNEST CUSHING RICHARDSON.

Princeton, New Jersey,
January 15, 1912.

PREFACE TO THE FIRST EDITION.

A WORD of explanation is due to the members of the Alumni Association regarding these lectures. The invitation to deliver them was a double one; on the one hand from a representative of the school who wished something on the philosophical order, which should be a contribution to the theory of library science, and on the other hand from a representative of the alumni who wished something very practical. The lectures are the result of an attempt to meet both wishes even at the risk of falling between two stools.

There is a perhaps small, but very earnest, number of librarians at the present day who are extremely anxious that the rising generation of librarians should be thoroughly grounded in the habit of searching the historical and philosophical basis of their art to the very bottom. They believe that the real progress of things in years to come depends precisely on that thing, that there is no danger of any neglect of the most thorough study of practical method in every aspect, but that there is danger that the habit of scientific thought will be neglected. They believe as cordially as any that the scholar without business ability and training is as much out of place in a library as he would be in Wall Street, but they believe also and with equal conviction that the best banker without literary and scholarly attainment is a pitiable spectacle as a librarian.

This view is perhaps held as concretely at the Albany Library School as anywhere, although the bibliographical and even palaeographical courses at Pratt Institute and elsewhere are strong symptoms of the same feeling. At the Albany school with its nearly fifty students, every one college trained, if anywhere, something of the most scholarly possible work can be, and is, attempted with success. It was felt that here, if anywhere, the attempt might be made to present to students of library science the view that the most highly philosophical treatment that can be given to its problems has important bearing on progress in the most practical details of the art.

It is by no means intended to claim that these particular lectures represent adequate philosophical knowledge or that their conclusions are in any sense final. They are simply the thinking of this one lecturer along this line. If there is in them any contribution, however small, so much the better. The point of the lectures, however, was not so much to reach results as to incite others to scholarly work. If the lectures fail to reach this end, whether through being too

scholastic or for any other reason, it will be a matter of regret to the lecturer, but it will be his fault, not the fault of the principle.

Of these lectures it may perhaps be said with some degree of reason that a pure discussion of the order of the sciences seems to belong rather to the college course itself than to a library school course. As a matter of fact, however, the student in college does not get this—at least does not get it in that intensely practical way in which it comes to those whose life work will be the interpretation of a system, or perhaps helping in the evolution of a new system.

As regards the matter in itself considered, one may sustain the thesis that it is as necessary for a thoroughly first-class librarian to know the philosophical order and divisions of the sciences as it is for a bridge-builder to know Mechanics. Those librarians therefore who say that they "do not see the use" of the study of incunabula, palaeography, the laws (rather than the rules) of classification, the history of libraries, ethics and social conditions as governing and governed by the production and distribution of books, the theory of literature, etc., etc., have an undoubted right to their point of view, but that point of view is not the one calculated to produce a true librarian.

There are those who seem to think that anything scholarly leads to unpracticality because many of the men represented to be most learned are unpractical. But are there none unpractical among the ignorant? Learning which is not practical is not scholarly but scholastic. Of learning which is practical there cannot be too much in any trade. Other things being equal — heredity, personality and common sense—the more "learned" a librarian is the better he will buy, the better organize his treasury, secretaryship, shelf and delivery and all the other departments, the better too will his books be cataloged, classified and used.

Since the lectures were delivered two observations have been made which require notice here. Mr. E. M. Fairchild, of the Albany Educational Church Board, has, apropos of the question of the natural order, called attention to the fact that the new educators, not only in colleges but in secondary schools, are coming to arrange their lines of teaching according to the "natural" order of the sciences. It follows that if the system of classification in vogue in any library is at variance in any way with the order in use in the schools the librarian must be all the more intimate with the scientific order to the end that he may harmonize, so far as possible, with his library classification and may guide pupils who are in the habit of thinking in another order. The use, therefore, which the library student will find for a somewhat intimate familiarity with the relations of the

sciences, theoretically considered, will not be limited by the use in making or altering a classification or even, what is its chief practical use, in classifying into it, but will extend to all sorts of reference work, from that of helping the special student down to that of helping the primary school child—or his teacher.

The second observation which calls for notice in this preface is a remark that "coming from Princeton campus" the lectures may, in some mysterious way, be calculated to cast an "odium theologicum" somewhere. The intention of the lecture was distinctly to stop with the merest reference to theology, and it was supposed that even this reference had been sufficiently guarded in speaking of it as the "theory known as Christianity," etc. However, in the fear that there may still lurk something explosive in the handling of so dangerous a subject, even in small quantities, and thereby unjust responsibility be cast on the Princeton Theological Seminary, whose professors the lecturer is honored to know, but with whom he has no official connection whatever, or even odium, theological, philosophical or otherwise, be cast on the University with which he is connected, I hasten to say that nobody connected with Princeton save the lecturer himself is responsible for these views or has even heard that he has them. Whether the possible odium is because the views are too orthodox or because they are too heterodox, informant saith not.

It should perhaps be noted that usage, which seemed fluctuating as to "ions" or "corpuscles" when these lectures were written, now seems to have settled on "corpuscles" for fractional atoms.

Orthographic usage is somewhat influenced by the preferences of the *Library Journal,* where these lectures were first published in part.

ERNEST CUSHING RICHARDSON.

PRINCETON UNIVERSITY LIBRARY,
March 20, 1901.

CONTENTS.

INTRODUCTION.

THE NATURE, KINDS AND LAWS OF CLASSIFICATION.

First by way of introduction, a definition of terms relating tothe nature, the kinds and the underlying principles or laws of classification.

1. THE NATURE OF CLASSIFICATION.

Classification is in its simplest statement the putting together of like things, or more fully described, it is the arranging of things according to likeness and unlikeness. It may also be expressed as the sorting and grouping of things. It is convenient, sometimes, to speak, of "likeness and unlikeness," but really in classification it is "likeness" which rules, while "unlikeness" is merely what is left over when likeness has been defined. The "putting together of like things" is therefore the fullest and most exact form of the definition.

So simple an act as the putting away of a handful of change in one's purse contains the gist of a process through which every thing and every thought in the universe has come into being—the paper money is put in one compartment, the coin in another and then perhaps the coin is subdivided again by putting the gold, silver, nickel, or copper each in a separate compartment. If the money is to be counted, it will probably be laid on a table, in groups of paper, gold, silver, etc., these groups arranged according to value into one and two cent pieces copper; three and five nickel; ten, twenty-five, fifty and one dollar silver; and so on with gold and paper. Into each group will be put all the pieces of like material and like value. The money in this act is fully classified, its pieces have all been put together according to likeness, first according to material and then according to value.

This is a mechanical example of what actually goes on in every process of classification whether of ideas or things. It represents also the real order of arrangement of things in the universe—a series of groups and groups of groups arranged according to degree of likeness from the simplest to the most complex. What this process leads to will be discussed under the order of the sciences, but the process is the same all along the line.

The object at which classification aims is in every case order or system and its result is called a system. It starts facing a disorderly mass, and aims to reduce this to an orderly whole.

If this is classification what then is a thing?

A *thing* as subject for classification is whatever is; that is to say, whatever has separate existence. Whether its substance is matter

or motion or spirit is indifferent. If it is, it may be classified, and if it can be classified it must be that it is. That is the whole of it. Identity, sameness, and thing-ness are one and the same thing. The characteristic of a thing is that it is itself. It is *a* and it is not *b*. It is discrete, separate and in short subject to definition.

Ideas are therefore the subjects of classification just as much as anything else not only because they have a material as well as a spiritual substance but because they are individual separate things existing in a certain place at a certain time in a certain definable nature.

Things therefore as the subject of classification include the things in man and the things outside. The things outside include in turn the things which make man (nature and environment) and the things which man makes or art. Things therefore include nature, ideas and art. Of these man has to do only with ideas and art. The things of nature are already classified, but this classification according to nature may be rearranged by man and this is art, whether it is plowing, or breeding, the making of houses, paintings or books, or yet the reorganization of a man's ideas in education.

Ideas themselves are therefore of two sorts, corresponding with the two kinds of outer things, nature and art. One kind is facing nature and the other is facing art, but the operation with either sort is one of classification. Classification of ideas on the one hand facing nature is knowledge, and when carried to perfection is called science. The classification of ideas on the other hand into a group which never yet has had any likeness in the outer world, but may have, and is intended to have, is art. The true classification of the ideas of things that have been, in short the classification of the sciences, is simply the order of nature paralleled. The classification into new ideas or art is by this same token not an imitation of nature and is endless in possible variety.

It must be remembered in this connection that from the standpoint of the individual, *i. e.*, the standpoint of knowledge, everything is an outside thing to a man save his own ideas (and perhaps even the major part of his own ideas.) Everybody's ideas save his own and all art, even his own if represented in outer things, is "nature." His business is first to get within himself exact ideas of these things and second to classify these exact ideas into a series which shall itself be an exact idea of the order of outer things. As a race and as an individual man gets his ideas helter skelter. When he starts to think they are a disorderly mass, a chaos of ideas which he must reduce to order by classification. The final goal of his effort is exact ideas of everything that is, arranged according to the real order of things in the universe; the idea, in short, of the whole of things, a

whole which includes ideas and art as well as nature. The process to that end is classification or the putting together according to likeness.

What then again is likeness?

Likeness, as the ground of the putting together of things in classification, is, in brief terms, interchangeability — the state in which some portion or element of any two things is such that it can be taken from one and put in the other and vice versa without changing the real character of each. A homely example of this is the Waltham watch. Take two machine-made watches of the better type, they are so nearly alike in all their details that any part of one may be exchanged for the like part of the other, or vice versa, and both watches will still go as before. They are alike in all esential parts.

Likeness is to be distinguished from identity or sameness on the one hand and from similiarity or resemblance on the other. Note therefore in the case of the watch that the pieces exchanged are not "the same" or "identical," but "like" pieces, and note also that a variation of the most trifling kind might stop both watches. The pieces must on the one hand do more than resemble or be similar. They must be alike. They must on the other hand be less than the "same" piece, otherwise only one watch could be kept going at a time. Likeness therefore is neither identity nor mere resemblance.

Likeness thus on the one hand is less than identity or sameness. One might possibly call identity "absolute likeness," *i. e.*, likeness in every conceivable respect including the position of each of its smallest parts in space, but this is forcing language. In this state it is the same substance. Absolute likeness, or likeness complete in every respect, including position in space is not to be distinguished from thingness itself, and is better called identity, or sameness.

Likeness might perhaps be described as identity in kind but not in substance. Like things are of the same kind, but not the same substance, and here is where a mistake is oftenest made. We say loosely that two gold pieces are made from the same substance. They are not; they are made of like substances or the same kind of substance, but every molecule of gold is a separate thing by itself and perhaps even every atom and every ion of it. Like things are not the same but equal, and perhaps the fundamental law of the determination of likeness might be described as the law that things equal to the same things are equal to one another. Likeness is therefore less than identity.

Likeness on the other hand is more than resemblance or similarity. These latter may be well described as partial likeness. Things are more or less alike according to the amount which they have in

common, *i. e.*, the amount which can be taken from the one and put in the other without material disturbance. It is a mere question of subtraction or better of algebraic substitution. The difference therefore between likeness and resemblance is the difference between exactly alike, very much alike and more or less alike.

We mean thus ordinarily by likeness or exact likeness, such degrees of likeness that no test or experiment which we can apply will reveal any condition under which one cannot be substituted for the other. We do not exhaust likeness even in this since even the minutest atom, which can be substituted for any other atom of the same kind in every known chemical compound is supposed to resemble its other atoms not as shot does shot, but as two grains of sand, each with its own individualities.

2. KINDS OF CLASSIFICATION.

Classification being the putting of things together according to likeness, there may be as many kinds of classification as there are kinds of likeness.

Likeness may be in respect of mass or weight, it may be likeness of form or shape (*i. e.*, all circles, crosses, etc., together), likeness of color (black and white marbles or children in a school), likeness in size (*e. g.*, grenadier regiments), in hardness (your lead pencils), in brittleness (table ware), in elasticity (golf balls), in conductivity (insulators). It may be in transparency, specific gravity, radiating power or what not.

The likeness may be one of position in space (geographical), or position in time (chronological), or of origin (genetic), or of power (dynamic).

The series in likeness which is formed may be in respect of quality (better or worse), quantity (more or less), extent or duration (longer or shorter), position (near or far).

In every case a series is formed by taking from many things what is common to each and letting the more like follow the less like or vice versa.

Where the likeness is one which is essential, which resides in the very character of the thing itself, the classification is called natural or logical classification; and this is, in fact, a classification according to the total amount of likeness. Classification according to some single mark of likeness is partial classification, while arrangement according to some accidental feature is artificial classification—the most familiar example of this being the alphabetical classification. Partial and artificial are often not distinguished.

The commonest kinds of classification are:

(1.) The *Logical Classification,* or classification according to degree of likeness from most complex to the simplest. This is to be regarded as forming one face of what is known as Natural Classification and of which evolution is the opposite face. Each regards all elements of real likeness, but the logical leads the series along the path of the real order of things back from the most complex to the simplest, from the now back to the beginning of things, whereas evolution leads it forward over the same ground.

(2.) *Geometrical Classification* is classification according to the order of position in space. It is founded on the fact that every atom of the universe at a given instant of time has a definite geometrical position with reference to every other atom. Its commonest form is the geographical, which arranges together all men, horses, cats, dogs, trees, etc., in given geometrical position on the earth's surface.

(3.) *Chronological Classification,* or classification according to position in time, is founded on the fact that at every successive instant of time every atom in the universe has a changed position with reference to every other atom. It groups together all things extant at a given time, *e. g.,* all men born on a certain day. Its commonest example is a table of dates.

(4.) *Genetic Classification* is the grouping according to likeness of origin and is seen every day in family history.

(5.) *Historical Classification* combines the chronological, the geographical and the genetic ideas and arranges, (1) according to position in space, (2) according to order in time, (3) according to the order of genesis.

This carried to its highest power results in:

(6.) *Evolutionary Classification* or classification according to the order of likeness from the simplest to the most complex. This is, as has been said, the complement of logical classification and both are faces of the one "natural" order.

To these familiar general forms should perhaps be added:

(7.) *Dynamic Classification,* or classification according to the order of power.

(8.) *Alphabetical Classification,* or classification according to the letters of names—one of the commonest of artificial classifications. And

(9.) *Mathematical Classification,* or classification according to the order of numerical symbols—the prince of artificial classifications and servant of all the natural classifications.

3. LAWS OR PRINCIPLES OF CLASSIFICATION.

A *law* is simply the way in which things are in the habit of acting. It may be defined as the like action of like things under like circumstances. Any given law is simply the historical fact that certain things under certain circumstances act in a certain way. The idea of law is that things having always acted in this way may be expected to act in this way in the future, although there is no guarantee of this, because some other "law" may come in to modify.

A law is distinguished from an hypothesis or a theory simply by the number of times that a given thing has been known to happen. If like things under like circumstances are seen to act in like fashion two or more times, we affirm an hypothesis. Care is then taken to note exactly, when it happens again, whether things and circumstances are exactly alike and whether the resulting action is still like those before noticed. When experiments have been carried to every conceivable extent, it becomes a law. The shades of meaning between hypothesis, theory, law and principle are such that one cannot quarrel much with the interchange of bordering ones, although one must try and stop short of the interchange of hypothesis and law and principle.

Among the chief principles or laws which have to be taken into account in classification are,

(1.) The *law of likeness*. Likeness is the universal principle of the order of things. Things are either already put together according to likeness in nature or they are put together by man in his mind or in outer material. Things arranged according to likeness without the aid of man are *nature*. Ideas arranged according to likeness are *knowledge*. Outer things arranged by man according to likeness are *art*. In every case the true likeness is the one which determines order.

In nature or outer things unmodified by man this principle of likeness reigns in mathematics in the law that things like the same thing are like one another, in physics according to the law that like masses attract in like manner. The most familiar example of this is a pair of scales where if the masses in each pan are equal they are equally attracted by the earth. If they are unlike in mass, the amount which constitutes likeness balances, but the remainder of mass is also attracted and having no counterpoise approaches the earth.

The law reigns again in nature in the magnetic and electric laws that like quantities attract (or repel) equally. It reigns again in the law of chemical affinity according to which like atoms attract

more strongly than unlike and the more complex a molecule the more unstable it is.

The principle of likeness in living things takes the form of the law of genesis, or that like begets like, and the complementary law of homology that real likeness among things indicates common ancestry.

Among ideas likeness is the foundation of all thought and every variation of the act of thought can be summed up according to Bain into likeness, unlikeness and retentiveness, or, according to Spencer, into likeness, unlikeness and integration. Likeness is so the essence of all human thought, that literally there is no smallest act of the human mind which cannot be analyzed into just this operation of distinguishing like and unlike and either holding to or rejecting. Likeness in particular is the foundation of that systematic thought carried to its ultimate which we call logic.

And what is true of science is also true of art, that every artistic impression is merely a classification of presentations of likeness and unlikeness. What we see in a landscape can be resolved into terms of contrast of light and shade.

Indeed the law of likeness carries itself into the active personality as well, for here it is that character resolves itself simply into choice, the classification of things into like and dislike and the integration of the like. Action itself is choice, or the classification according to like and unlike.

In the field of Sociology, enlarging from the sphere of individual character to the nature of men as a whole, it may be said that all social relations, economic and political, are founded according to the latest opinion upon the fact of likeness, or, if you choose, the consciousness of likeness, the "consciousness of kind," as Mr. Giddings says.

Likeness is therefore characteristic of all things and its law may be expressed as the law that all things in the universe are organized according to their likeness. Many if not most laws are so to speak sub-laws of this and among those especially interesting in our task are: (a) The law that things like the same things are like each other, (b) The law that like draws like, (c) The law that like begets like, and (d) The law that true likeness points to a common ancestry.

(2) The second general principle useful for our task is *the historical law* that the progress of things in space and time is also in general a genetic progress in complexity.

(3.) The *law of evolution* adds to the law of history the observation that the law of historical progress from the simple to the complex holds good of all things which tend toward continued exist-

ence. In the general use of the word it is a complex including the ideas, (1) of logical progress in complexity, (2) progress in space and time corresponding with progress in complexity so that the order of complexity is also the order of appearance in time, (3) the genesis of the more from the less complex, (4) growth in complexity the condition of life, and (5) degeneration which is the complement to evolution proper and adds the fact that wherever things are not growing in complexity they are proceeding toward dissolution. The net result of the law is the doctrine that in the long run those things which are constantly growing in complexity continue to have existence while others perish.

These laws or principles are as you see simply a sort of resume of what went before as they are the foundation of what is to follow.

LECTURE I.

THE ORDER OF THE SCIENCES.

I. DIVISIONS AND UNITY.

The order of the sciences involves two things, first, divisions, groups or classes; second, unity or order. The end is a whole, the process is a defining of classes and the binding of these classes together into a whole. Each function of the process is a putting together according to likeness. The division of the sciences and the putting of them together, are alike classification. The end in view is an organic whole in which there is a place for everything and everything in its place. This organic whole of sciences is science. It is a whole of parts, a one from many, and the order of the sciences is a description of the relative place which each part holds in the organism.

It is to be remembered all the time through this discussion that sciences are not separate things, but only divisions in the sense that a man's hands, feet, eyes, etc., are parts of a whole. Every man is a unity. A distinction between hand and wrist is practical and useful, but who shall say just where hand stops and wrist begins? So too of science and the "branches of knowledge." Who shall say where the trunk stops and the branches begin?

The phrase, "Classification of the Sciences," seems to point rather towards a division into groups, the "Order of the Sciences" toward a united whole without, however, losing the idea of its being a whole of parts. It is for this reason that "Order" instead of "Classification" has been chosen as caption for this lecture, for it is likeness which rules, not unlikeness, unity not variety, and classes are sure soon to overstep one another's boundaries and get out of perspective unless a final unity is held constantly in view. The real problem is one of unity, for the rough groups which every one can pick at a glance only adjust themselves within their own boundaries and to one another in their adjutsment to the whole.

II. THE ORDER OF THE SCIENCES THE ORDER OF THINGS.

The first thing to be remembered in trying to get at the divisions and unity of the sciences, whether one in prosecution of the task is facing toward divisions or toward unity, is the fact that *the order*

of sciences is the order of things. The science itself is nothing apart from the things or facts with which it deals. To define a science one must define the group of facts with which it deals. When a line has been drawn around any group of facts then the science is simply the analysis and classification of those facts, the placing them in their true order within the boundary. What is true of any one science is true also of the whole of the sciences. It depends directly on the whole of things. The bottom fact thus from which attention must never be diverted in this search is the fact that the order of the sciences is simply a counterpart of the order of things.

It is hardly too much to say that the chief drawback to progress in the conception of the whole of things has been this very confusion between the inner realm of ideas and the outer realm of things. Men have somehow looked on their own ideas as the place where the order of things was to be discovered, and many systems of classification, such, *e. g.,* as that of Bacon, have been founded on subjective laws. It is, of course, within the mind's sphere of ideas that a man must work. He does not deal with the things themselves directly so much as with little brain maps (brain drawings or brain models, so to speak) of the things themselves. Yet at the same time it is true that these very brain maps themselves have no meaning or value save as they are true and complete images of the outer reality. It is the outer universe which is the starting point and fixed factor of all the search for order. As the inner idea corresponds with the real fact or truth or not, it is worthy or worthless.

If perchance any man's ideas were ever perfectly true and complete then the problem of order would be simple enough and could be performed wholly within the cloister of his own mind. It would then be nothing more nor less than putting together a picture puzzle or "assembling" the parts of a locomotive, and there is in fact a theory of "innate ideas" which supposes just this, that every man is born into the world with just such a stock of ideas or intuitions, perfect in quality and quantity. As a matter of fact, however, no one will deny that a man's ideas, whether inborn or not (and the Librarian thinks that there are inborn ideas), and whether they are true-born or not (and the Librarian thinks that they are not true-born), are certainly not true by the time the man gets to the reflective age. So far from being true that the problem is simply that of assembling the finished parts of a locomotive, it is more like arranging the battered and twisted fragments of a locomotive after a wreck. The only way that it can be done at all is by comparing with the original model, hammering and forging twisted ideas and supplying lost ones. But men forget this. They try to put the whole together

out of their distorted and defective ideas as they are instead of comparing them often and strictly with the outer world. If the attention is kept strictly on things as they are, the ideas of things will classify themselves, including the ideas of things as a whole, but there is no escape from the method. Every man who starts to set up his fragmentary ideas into a working whole must then compare often with his model, the outer whole. If, on the contrary, a man shuts himself up within the circle of ideas that he has already gotten, as he has gotten them, he simply goes round in a circle, stumbling over the same contradictions because the ideas are no more and have still the same deformities.

The starting point therefore of all progress toward getting a clear conception of the order of the sciences is the axiom: The order of sciences is the order of things.

The history of the establishment of this idea belongs rather to Philosophy than to our present task. The School of Experience no doubt paved the way; but it was the positivist Comte who gave the greatest recent modern impetus, and Spencer and others of his school who have done much to bring it into clear-cut statement and something as well to confuse the issue.

III. ORGANIC UNITY.

Starting with this the way is cleared of its greatest obstacle, but the order is by no means yet reached. The matter is in fact hardly less puzzling than before. The point of attention has been changed from the mass of ideas to the objective world of things; but we have not yet the answer even to question whether there is a universal order of things at all, or if there is of what nature this order may be.

So puzzling is the question that there have been those, of course, who have denied that there was any such thing as an order to things at all. Besides these skeptics there have also been many (and they include a large school of idealists) who have held that the only order that there is among things is an order of ideas; that there is no actual counterpart to that order in external things, if indeed there be any external things at all. They say that there may be an order to the universe within the mind—the microcosm, but that there is none to the outside world.

In spite of all the baffling contradictions, however, there is such perfection of order in minor groups of things that the more one seeks the more he finds growing in him such a sense, strong though elusive, that there is, if it could only be grasped, some kind of relation for pretty nearly everything that is, that he returns to the common

habit of mankind of taking it for granted that there is such a thing as order, and this order one such that it may be found out; that the whole of things is in short a Cosmos, not a Chaos. At all ages of the world, it has in fact been generally held as true that there is some such order. What the nature of this order is has been variously expressed, but there is a curious harmony between the most ancient and the most modern views in calling it "living" or "organic."

This idea that this whole is a "living thing," familiar to us in Plato's Timaeus, is contained in the most primitive myth of the "world tree" and in the most modern philosophies as well. Indeed, if we may believe Herr Lotze, human thought never does rest, and never can rest until it reaches a place where "the whole content of reality is conceived under some principle of organic unity." (Ormond, Found. of Knowl., p. 98) *e. g.*, conceived of as a tree or animal rather than as a molecure, a crystal or a system of planets.

Most men therefore agree that there is a "unity," but to find in what this unity consisted, and especially what Plato means by calling it "living," and the moderns by calling it "organic," has puzzled librarians and philosophers alike. Endless attempts have been made from every point of view to solve the riddle, and although these differences on the whole are hardly so remarkable as the resemblances, yet the solutions are practically as various as the attempts.

IV. THINGS PAST AND THINGS PRESENT.

The greatest clearing of the lines came in with the development of the idea or law of Evolution. Thanks to this idea we have now a clear view of a second great fact which cannot be kept too clearly in mind in our present task, to wit: the fact that *the whole of things includes not only things present, but things past.* The ignorance or neglect of this fact has, like the neglect of the outer world, led to the greatest possible confusion in the past and leads constantly to confusion still, when the conception is at all slighted.

The common if not exclusive popular idea of a whole of things has been a great molecule or crystal or system of planetary systems. However true this may be of things that now are, it does not include things that have been. There is no place in such a system for plants and animals which have no living specimens, no place for Julius Cæsar, and so on. The mechanical universe is in short not a whole of things past and present, but only of things present, whereas the real universe had Julius Cæsar in it, and what is more the historian and the librarian have to take concrete account of the fact, one to

locate the actual point in history when and where he was, the other to represent that point in a system so that a book about him can be put in a class.

The idea that things have a history is not a new one. Applied to man, at least, the idea is familiar enough, but applied to everything in the universe, from suns down to the smallest molecule, the idea only finally came to light with the doctrine of evolution. Now it seems curious that we did not realize that not only does every atom in the universe depend on its position at a given instant of time on the position of every other atom, but that it depends on its own position at every previous instant of time, and that these positions were dependent in turn on the positions of all others at that instant and they on it, and so on every position of every atom at every instant being dependent on every other. Every animal, every plant, every molecule at least, possibly every atom even, has thus its history, and every one has affected every other or has been affected by every other or both throughout one organic whole from the time when the first vortex entered the world fluid until today.

V. IDEAS AS THINGS.

Still a third thing which helps to clearness in our task and the neglect of which has caused confusion, is the fact that *ideas are real things*, calling for a place in the order of things. Every man's idea, whatever may be the substance underlying it, whether matter or force, has a definite place in space and time, and is at least accompanied by a definite molecular form. These ideas are located some in the minds of living men, real things now existing each in its own definite place. Some were located in the minds of men now dead. We have fossils of these ideas now in books, statues and pictures, just as the scientist has his fossil animals. The idea itself is in this case a thing of the past, but it may be reconstructed from books just as the long extinct animal from its fossil remains. The true book, the true picture, the true statue, is not the one of paper and ink or canvas or marble, but the living thing in the mind of the living artist, and we must distinguish these living ideas both from things past and things to come. In every individual man there are these ideas, some representing things that have been, some put together out of ideas that have been to form things that may be—ideas of nature and new ideas, which are themselves art and created also into material outer things are known as Art.

These three things therefore are to be kept clearly in mind, (1) that the order of the sciences is the order of things, (2) that things

include the past as well as the present, (3) that things past or present include ideas as well as nature or art.

VI. THE ORDERING OF IDEAS.

With a clear idea of these three things we are ready to apply the fundamental ideas which have been worked out for us and have been defined in the introduction, and among them particularly the ideas (1) that all our science is a search for likeness, (2) that the order of things is the order of their complexity, (3) that things which are growing more complex are tending towards life, and conversely.

The situation now before us is this: we stand face to face with a chaos of our ideas, one vast jumble of ideas of houses, stones, books, trees, other men's ideas, plants and what not, piled up hap-hazard and stored hap-hazard. The problem of every man who reaches thinking age is just this, to reduce such a body of ideas to order so that he may have a connected view of everything that is, so far as his ideas go, and incidentally to enlarge the ideas themselves as far as possible so as to get as nearly as possible a just idea of the whole of things. This idea of ideas, this idea of the whole, which includes all other ideas organized into one idea should be an exact counterpart of that other whole which includes all things organized into one thing—in short, it should be an inner cosmos "mirroring" (as Haeckel would say) the outer cosmos.

In attempting now to make a cosmos out of an inner chaos of ideas by applying our principles to the conditions, we understand of course thoroughly that in our task of arranging in continuous series according to likeness from the simplest to the most complex we are aranging not things themselves but our ideas of things. We understand equally well, however, on the other hand, that we can make no possible progress towards this real arrangement of ideas unless our units, our ideas of each thing are exactly like the reality, and unless the groupings of these ideas is also like the real grouping of things in the universe. The first step is therefore to make each unit idea exactly correspond with the reality. Then comes the putting together of the ideas by likeness, or their classification.

VII. AN HYPOTHETICAL ORDER.

Looking now at our heap of confused ideas (like a basket of various colored skeins of silk), there are certain things which are easy enough to notice. Men have heretofore long had a rough idea that things may be divided into "nature and the supernatural," and

that nature includes "the vegetable, animal and mineral kingdoms." To-day we group nature into lifeless and living—plant and animal, but the general idea of vegetable, animal and mineral is not changed nor the fact that we then have a large class of alleged phenomena: God, the angels, fairies, miracles, etc., left over, the science of which, for convenience at least, we may call Theology. Even the order which we call "evolutionary" has long been recognized to a degree in a vague idea that the plant was "higher" than the mineral, animal than the plant, and God than man.

But however near the truth the older systems may have come in their vague way, it is only with the growth of the new science that infinite puzzling contradictions have been done away with and clear lines definitely established. Of course even now we must be far from the absolute goal, but this much at least it is safe to say, that, thanks to modern science and its laws, every one may now get if not a perfect idea of the whole, at least a clearer one than was ever possible before, save perhaps to a few seers like Plato and Moses.

Briefly expressed (and this you may call Hypothesis), the clearest groups of things are the lifeless, the living, the human and the superhuman, and their corresponding science are Hylology (or the mathematical-physical sciences), Biology, Anthropology and Theology. This, too, is their order. It is the order of their appearance in time. It is the logical order, the order of complexity and the order of power. Those even who classify the idea of a personal God under morbid psychology cannot refuse to consider a "cosmology" or science of the whole, a science more complex than that of any of its parts and of these few many like to call this wholeness itself God. Theist and Pantheist alike therefore will call the science of the superhuman Theology, though the strict naturalist may prefer to call this most complex of sciences cosmology. So this tentative order of Hylology, Biology, Anthropology and Theology may well stand. It is said that the sciences themselves have grown up in this order, but we cannot go into this now.

At first sight it seems curious to speak of the superhuman as a climax in the order of complexity, but regarded as the material of a science it does at least include everything preceding plus angels, God, and, if there be such things, fairies, etc.

Again, it seems more curious still to speak of the superhuman as historically later in time; but the theory of Christian theology (as well as of the Vedic) is that God did not "enter into time" or become flesh; that is, did not take organic part in his universe until after and through man. Regarding Theology as a science, therefore, we have the authority of the same religious theory for saying that there is

no science of God save that whose subject-matter is the Incarnate God.

I therefore repeat that the order of things is lifeless, living, human and superhuman, the order of sciences *Hylology, Biology, Anthropology and Theology.* This, of course, is only the barest outline, but it gives classes to hold everything and a reasonable order. It offers at least an epitome of wholeness such as the Baconian system, for example, does not do.

When it comes to applying to detailed sub-divisions, the principles of "likeness" and of "growth in complexity," etc., which have just been applied to the broad general divisions, while we may not get everything clear, we shall clear up many of the old puzzles which have most troubled the classifiers (and librarians perhaps most of all for their task of classification, dealing, as it does, with concrete things is more imperative than the classification of ideas). Thus, *e. g.,* History, Art, Literature and Technology, as well as Theology, emerge from their Mohamet-coffin position as not-sciences into solid earth as sciences, and the vexatious subjective distinction of "abstract and concrete" science "pure and applied" vanish.

This matter is pretty abstract to be discussed with any clearness, especially in non-technical terms, within the limits of a single lecture, yet we will try to get some notion of it—some "tail-feathers" of the idea, as a certain distinguished professor of Theology might say.

VIII. COSMIC HISTORY.

It will simplify the matter if we begin by trying to trace the objective history of the whole of things in space and time from the beginning until to-day from the simplest to the most complex, as well as the present state of our knowledge will allow. If we can thus get a general view of this connected historical whole of which the material universe of to-day is the front rank of the advancing march of an army of atoms through time, the front wave of a stream reaching back to its source, we can then divide and name the sections at pleasure.

Suppose in the beginning then only little things in a world fluid, all alike, or a single little thing only. It is immaterial to us whether these little things are vortex rings or hard particles, so that they be exactly or substantially alike, so alike at least that no distinction can be made in them by the human mind. This was once the conception that we had of atoms. Now we suppose that atoms may be redivided into ions. Suppose this to be true, and we have then to begin with,

first, a world fluid, second, loose ions in a world fluid uniting here and there in groups of greater or less number, more or less densely, to form atoms of various degrees of complexity.

The point about each atom now is that it is itself a "discrete" thing, which "moves as a whole, so that its parts, if it has any, do not part company" under ordinary conditions. It has a separate individual being which is not simple but a complex of ions. This complex is, however, so firm that under ordinary conditions of substance its ions do not part company, though it is conceivable that there might be conditions of heat, electricity and light under which they would do so. The world fluid filled with these ions in various degrees of density short of the atomic stage may be supposed to be what we call ether (and all this applies quite as well to what is known as the condensation theory as it does to the atomic), unless indeed we are to suppose that in the ether the ion stage has been already passed and the atomic begun. The nature both of ion and of atom is somewhat recondite, but this much at least seems clear, that the atom is no longer to be looked on as simple and indivisible but as a complex of ions.

The next stage of world history or evolution is when these ion-complexes, or atoms, themselves unite with one another in various degrees of complexity to form again a series of things, each of which "moves about as a whole" and is not broken under any ordinary conditions. These independent groups are called molecules. Here we begin to walk on firmer ground. We know that we have some seventy different kinds of atoms. These atoms are united, some with like atoms to form the elements, some with unlike atoms to form still more complex molecules all the way up to the very high degree of complexity of the carbon compounds and their topmost branch protoplasm. It is not said that these cannot be resolved into their elements by sufficient heat or made more solid by cold (probably they can), but that under ordinary conditions they keep their thingness, their separate individual identity. It is to be remembered, too, all the time that from the beginning we are dealing with things which however much alike they may be, are at least each separate in space, and that this is true even if their boundaries are the same; for in this case they may simply interpermeate as whole molecules of sugar in water, or broken up into parts as in the case of salt in water.

Now all the time that the nearer things are forming more and more complex groups of atoms or molecules the process of grouping is going on, not in one part only, but in all parts of the world fluid, groups of atoms formed into molecules are again formed into new groups or masses, and these wholes are themselves separate indi-

viduals in space, yet not unrelated to all other masses, and in some cases, at least, in the universe, united into groups of masses themselves separate individual things, to wit, planetary systems.

Some of these masses are, we understand, wholly of one kind of atom, say hydrogen vapors. Others, like the sun, contain nearly every element or every kind of group of like atoms. Others, like the earth, contain both elementary and complex molecules, although so far as human knowledge goes, this earth alone contains complex molecules. Whatever the fact may be, so far as our knowledge of the fact is concerned, *i. e.,* so far as science is concerned, the earth is the only place in the universe where complex molecules are gathered. It is therefore, so far as the classification of science is concerned, the most complex of all molecular aggregates in the universe.

Glancing back over matters, we have, up to this point, ions, groups of ions = atoms; groups of atoms molecules; groups of molecules = planetary systems, and each of these has left behind it in each case many individuals not organized into a system.

This same process now continues among complex molecules, certain members of one kind of which alone, *i. e.,* protoplasm, become organized themselves into independent groups which we call cells. These cells are again in turn of various degrees of complexity, vegetable, animal, etc., up to the human. In the human cells alone is the mass of the most complex cells, the idea-cells(?) organized again into a new independent molecular unity, a logical idea of ideas, a human personality.

Among these new molecules again, to wit, these human personalities or men, there is again a tendency towards union into individual nucleated groups called societies, separate things in space. These include voluntary societies, families, nations, churches, etc., perhaps the best example being so far as appearance is concerned and so far as relates to things that now are, the Roman Catholic Church.

According to the theory known as Christianity, the true organism of human personalities is a certain definite if unlimited number of persons organized into a group whose nucleus is the historic Christ. These form a new independent organism which "moves about by itself" and leaves behind many persons not organized into it. Its own individual particles can only be disintegrated when they have broken from the organism of this new molecule or cell. This new organism is known as the (Invisible) Church, and is supposed to have a real existence dating from a given point in space and time (that is the historic Christ), at which time, however, the human cells previously formed were taken into the organism. This organism is to be regarded as a thing now existing as a real entity. Whether this be so

or not, the visible church at least is such a real society, and is one of the things which must be taken into account, analyzed and classified under any theory of science. Whether the matter falls under the science of Theology or that of Anthropology may be hard to decide, but then all border lines in classification are hard to distinguish. There is no real cleavage.

Whether again this is the end or not; whether in the future there is to be any group of such groups distributed anywhere in space and forming a society of societies throughout the universe is only a speculation, and sounds somewhat fantastic, even as speculation, and yet it seems to be the logical result of the evolutionary process if it is to continue.

It is to be remembered that all this development of complexity has been a development in time as well as development in space and a development in complexity of nature. Each more complex has followed the less complex in its appearance in time. We have now arrived at the "now." We have a mass of more or less highly organized things, groups, atoms, molecules, planetary systems, cells, men, societies of men. They are the things with which we deal in science, and this order of their history is the general order of their sciences.

IX. THE ORDER OF COMPLEXITY.

In order now to get further divisions than those mentioned at first and to give them names we trace the history backward and forward and mark the lines of its branches from point to point.

The simplest thing that we can think of is a single ion in a world fluid at a single instant of time, but even with this the science of *Mathematics* has begun, for simple discreteness makes two things, and Arithmetic, the science of number, has had its birth. There may be any number more ions in the world fluid at a single instant of time, and Mathematics be advanced to a most complex stage, but *Physics* does not come in until the idea of time is added. Given, however, one ion at two successive instants of time and we have the idea of motion in the passing of this ion from one point in the world fluid to another and with the idea of motion the science of Physics is born. *Chemistry* does not come in until things have reached the molecule stage. It does however apply even to the simplest one atom molecule and to molecules of like atoms, as well as to compound molecules of the utmost degree of complexity. It has its beginning thus in the first molecules, whereas *Astronomy* only takes its beginning with the union of two molecules in a mass. *Biology* again does not exist even in the most complex carbon molecule, but only comes in when mole-

cules are organized into a nucleated cell, although it belongs to the very simplest single cell as truly as to the most complex animal. *Anthropology* again, as distinguished from Zoology, only comes in with the organization of ideas, but it does exist in the most rudimentary organism of classified ideas. It is open to some question whether a man does organize ideas except as a consequence of social acitvity, and whether the Anthropology itself is not *Sociology,* and indeed Comte does put Sociology at this stage instead of Anthropology. Nevertheless every individual man does have a classified body of ideas, such as no animal has, and is what may be called an organic consciousness in a sense in which the animal is not. It therefore seems better to mark off this stage, as Anthropology including (1) the science of organized ideas in their exact correspondence with outward things, or knowledge (epistemology), and (2) Aesthetics, the science of the construction of new ideas, or creation, (3) Ethics, the science of perfection both in inward correspondence with reality and in the construction of new ideas, whether within or without, and if without whether in reality or in symbol. If psychology is admitted here and not relegated to biology it is practically identical with anthropology, or may be regarded as the physiology, as epistemology and aesthetics are the morphology of human personality.

It is by the further analysis of man as a creator that we arrive best at the fourth division of Anthropology or Sociology.

The science of æsthetics includes as its subject-matter new ideas in various stages of embodiment. First they are formed in a man's own molecular brainstuff, afterwards in outward reality. With human creations in outward reality the series begins over again, lifeless, living, human (superhuman?). A man's art ideas include (1) ideas embodied in lifeless things, tools, houses, clothing, etc., the mechanical arts generally, (2) ideas embodied in living things, to wit, agriculture, animal-culture, fishing, hunting, breeding, etc., (3) ideas embodied in the minds of other men. The instruments to this final embodiment are what we call the fine arts — music, gesture, painting, sculpture, words, following again a series from simplest to most complex, the crown and climax being the embodiment in another personality of one's own body of ideas, the creation therefore in another of one's own organized ideas as a whole, the binding idea being one's own idea of the whole. If this could be done perfectly in its entirety a man's own whole personality would be embodied in another, yet notice that the two persons though exactly alike would yet be two different (if perhaps somewhat monotonous) persons.

This art of embodying one's own ideas in another we call education.

Now by this production of likeness of idea in one another, through art, and especially that form of art which we call language, the possibility of Sociology comes in, and so far as ideas have been made alike there society exists. Where this likeness is society is, and unity in such a society is specially promoted by having some central person or central book or some central idea such as Liberty to organize ideas about—to furnish a common ground of likeness—a likeness which runs through everything.

Theology only comes in in this series when the organization of ideas in the man has a superhuman center. We have now gotten beyond our limit, but may suggest that Theology includes (1) *Cosmology,* or the idea of things below the human personality as being centered in a divine person. (2) *Christology,* or humanity in its individual nature centered in a person. (3) *Ecclesiology,* or the society of personalities centered in a divine person united by "likeness" to him, and (4) *Theology,* or the science of all things living, lifeless, human and superhuman centered in a person. The applications of our various laws to current conceptions in these matters is obvious.

X. THE ORDER STATED.

We have therefore (1) Mathematics, the science of number and of relative position in space at a single instant of time; (2) Physics, the science of motion or change of position, up to and including the organization of like ions into like and unlike atoms; (3) Chemistry, the science of organized atoms or molecules; (4) Astronomy, the science of organized masses; (5) Biology, the science of life or of the cell; (6) Anthropology, the science of the human, including (6a) epistemology, (6b) æsthetics, (6c) ethics; (7) Sociology, the science of human groups; (8) Theology, the science of the superhuman or of all things, lifeless and living, organized in a single center; (a) Cosmology, (b) Christology, (c) Ecclesiology, (d) Theology proper.

Following is the graphic statement:

Hylology:
- Mathematics.
- Physics.
- Chemistry.
- Astronomy.
  - Geology.

Biology:
- Botany.
- Zoology.
  - Physical anthropology (?).

Anthropology:
  Psychology (Human).
    Epistemology.
    Aesthetics.
      Useful arts.
      Fine arts.
      Language and literature.
    Ethics (?).
  Sociology (incl. "History").
Theology:
  Cosmology.
  Christology.
  Ecclesiology.
  Theology proper.

This, of course, is not to be regarded as final in any sense, but as an hypothesis on which we may climb to a better. It certainly includes some elements of clearness not possible until recent years.

LECTURE II.

THE CLASSIFICATION OF BOOKS.

I. BOOK CLASSIFICATION AN ART.

THE aim of this paper has been described as practical. By this is meant that it aims chiefly to suggest certain adjustments or adaptations of the strictly logical order which are made necessary in the matter of book classification by the fact that we are dealing not with ideas but with concrete things.

This need of adjusting theoretical classification to practical conditions is not peculiar to the classification of books, but is characteristic of the treatment of all complex concrete things. It is sometimes said that the classification of books differs radically from classification as used in science in that many books are made up in such way as to cover a great variety of subjects, *e. g.*, periodicals, books of essays, etc. It is true that books are complex, but for that matter so are things in the universe; the crust of the earth, for example, is made up not merely of seventy different elements, but of seventy times seventy combinations of these elements massed in every imaginable sort of form. A book could hardly be more complex as to subject than a lump of rock may be as to elements. The classification of books is like classification of specimens in a museum. Each is an art. Neither is theoretically exact. If we attempt to rearrange things strictly according to likeness with scientific exactness, we have to vaporize them so that the elements may be brought together. This is precisely what the chemist does, and what he does with molecules we can do pretty well with ideas so long as they remain in that more or less volatile condition where we call them "thoughts." We cannot, however, do this so well where the ideas have been crystallized into books. Even among ideas vaporizing them so as to recrystalize according to their real likeness is a painful task and few enough men have mental heat or enthusiasm sufficient to do it very often or very perfectly. They prefer to let their ideas stay in the original mixed masses in which they first cooled, and in the order in which they then happened to be. This is what is generally though falsely called conservatism when applied to thoughts. It is in reality intellectual petrification. Books on the other hand are real petrifications, or rather planets in an advanced stage of evolution, where the mass of ideas has passed out of the fluid into a solid unchanging

state. They do not therefore, however, differ "radically" from other complex masses in the matter of their classification. All masses alike, whether books or stones, are conditioned in the attempt to arrange them in space according to their likeness by the fact of their complexity and need to be adjusted accordingly. But this does not, however, make the theoretical order of less value; on the contrary, this ideal order is in the end the only one which can serve as a real basis without ending in a chaos of self contradictions. The librarian can no more afford to ignore the question of the real scientific order in arranging his books than the professor of mineralogy in arranging his specimens. It is identically the same thing. I wish I could say that the average librarian had the same scientific attitude towards his problem that the average professor of mineralogy has towards his. The fact is that the practical modifications which complex concrete things call for in their actual classification in space are similar for all masses. The classification of books is, however, in some respects the best example of this—so much so, in fact, that if there were a philosopher here present I would commend to him the study of book classification as being as valuable to him as I have urged that theoretical classification is important to you.

The main fact about the classification of books is in brief the fact that it is an art not science. The classification or order of things is nature and is not a human creation. The classification or order of ideas follows the order of this classification of things and is science. The classification of books, on the other hand, is an art—a human creation for a human end. The order of sciences is its backbone, but in the adjustment of books in this order there are many practical accommodations to be made, determined by not merely complexity of material but by the end in view.

This classification of books deals, as we have said, with concrete objects, not with ideas; its end, too, is not a scientific law, but a rule; not the discovery of how things are done, but the formulation of a decree as to how they shall be done. The end of ends in scientific study is, properly, a scientific law suited to produce in a man the exact knowledge of what is, the end of ends in the rules of art is to produce in concrete substance something which never yet has been, suited to a certain purpose. If you say that in this statement the analogy with other complex things falls through, I say that it is of no great importance if it does come to an end at this point, and yet the fact is that the mineralogist who arranges his specimens with strict reference to illustrating the real order of things does face nearly the same artistic problem. Suppose, *e. g.*, a vein of gold embedded in quartz. In a metallurgical collection it could be arranged according

to its metal, in a collection illustrating, *e. g.*, the strength of materials, it might be arranged as quartz. This is the chief book classification problem in a nutshell—the arranging of complex material with a view to its practical end. The main factor is the end sought. The adjustment of material depends on this end.

In describing this paper as practical, therefore, it is intended to imply not a systematic technical treatise, but only the treatment of the practical modifications of the theoretical order called for by the fact that we are here treating complex material with reference to a practical end. No attempt will be made here to give a survey of the history of classification, or a history of that discussion of its individual points and problems of which our American library history is full, nor yet in any sense will the attempt be made to give detailed description of technique. This is the ordinary commonplace of library school routine. You are doubtless referred in your classes to Kephart's bibliography in the World's Fair papers, to the introductions of the Dewey and Cutter systems as well as to the pages of the library periodicals, and in particular to the index to the *Library Journal,* not to mention the treatises of Maire and Graesel and the like. When these papers are printed they will have something of the nature of a historical sketch with outlines of various systems both theoretical and practical; but for the brief treatment of this lecture the historical and technical must be largely disclaimed. Even what I have called the practical aim of this paper is therefore in a way theoretical, but it is the theory of an art, not the theory of a science. In short, it is method, and, as has been said, its aim is to distinguish the difference between book classification and theoretical classification.

II. BOOK CLASSIFICATION AND CARD CLASSIFICATION.

The first step in this process of differentiation is evidently to explain what it is here intended to include under book classification. In speaking of the classification of books here then, it will be understood that both the classification of the material books on the shelves and the analytical classification of the contents of these books in catalogs and bibliographies will be included. Although there are some differences between the two kinds which will, from point to point, be noted, the principles and practical difficulties of these two forms of book classification are substantially the same. The chief difference lies in the fact that the card classification can be carried nearer to scientific completeness than that of books on the shelves, for it is not conditioned by the paper and binding, and the analysis

can therefore be carried further. The librarian who analyzes his books in this way approaches nearer to the chemist who vaporizes his material and yet he never reaches his point. He is rather like a mineralogist who is so situated that he cannot apply the blow pipe and must get as pure a lump of ore as may be by breaking. It is only the author who uses the contents of books to make new books, breaking up the very ideas in the alembic of his own mind, who is the scientist of books. He alone makes the book-atoms free to take their affinities. Nevertheless, as has been said, the difference between shelf-classification and analytical card classification is considerable in this respect and is like the difference between big rough lumps of mixed ores and smaller purer specimens which can be arranged with greater exactness.

But whatever differences there may be between these kinds they are alike as to (1) the object that they have in view and (2) the different ways in which the classification can be carried out.

III. THE OBJECTS AND IMPORTANCE OF BOOK CLASSIFICATION.

If we come down to the real fact why we put books or cards together according to subjects in a library, we find that it is to get together those books or cards which will be most used together. The object is a practical one just as the object of the library itself is a practical one. Libraries are not gotten together as a museum to exhibit what we have called the fossils of knowledge. It is a machine got together to instill that knowledge into men's minds. The books are collected for use. They are administered for use. They are arranged for use; and it is use which is the motive of classification.

The putting of the most used books together saves in the first place actual labor on the part of users and librarian in assembling any given mass of material for use. No catalog can take its place. It is sometimes said that the bibliography or catalog serves as well or better, but suppose the user or librarian does get bibliographical references to all the things that he wants in a classified catalog. The work then has only begun. Somebody must either go from one point to another and examine the different books where they stand on the shelves, or else some one must go to each point and bring together in a class temporarily the things wanted. In an unclassified library the books are thus classified over again every time a man wants to use them. It is a labor saving device to assemble them in classes once for all instead. It is sometimes objected to this that no classification actually does get all the material that a man wants together, and that a man wants to use it from various points of view at differ.

ent times. This is entirely true, but what of it? It is aside from the point. One might just as well refuse to pick up pound nuggets in gold mining, if he should have the good luck to find them, on the ground that there were still gold dust to be gotten by panning. Any roughed out group of books is a positive and great gain to economy in bibliographical search and promotes economy in the actual use by bringing the books together in space and thus saving innumerable steps on the part of the man who goes to the shelves to consult them. The actual advantage to science which comes from having books closely classified, through this economy of labor in the work of research must be, even in our present hardly fully developed usage, hundreds of years annually to the highest of all skilled labor—that of the highly trained expert scholar. When you put it down as a cold, concrete fact that good classification in any group may save in a few years the research-work of a man for a century it begins to be a very practical matter. The saving of actual dollars in administration (*for a given efficiency*) must figure out as equally great. I believe the statement will stand the most careful examination, that in a large scholarly library, doubling the entire delivery and reference force would not give the efficiency to an unclassified library of even a barely tolerable classification. A prime advantage of having most used books in classes together, therefore, is the fact that the rough bulk of material so gathered together saves a vast amount of bibliographical work and a vast amount of work in actual gathering together and use of material.

A second and great advantage of having the most used books together in the classes in which they are used together, is that they furnish in this way an incentive to the user to get a full view of his material. This is a matter of the utmost value. Men are naturally lazy. They are too little inclined anyway to exhaust material, and when you add to this also the fact that the scientific man is generally also extremely ignorant of books, you open a vast field of profit in a method of setting out before a man so that he can get at it with the least trouble a large amount of his material. In looking over much material, too, he is pretty sure also to be tempted by references to look up other material (such as articles in proceedings of academies) not grouped in the class—at least he is more likely to than if his only resource was chasing up bibliographical references apart from the books. Men not librarians are almost invariably surprised to find how much material has been written on their subject. It very often happens that they find that work on which they have been wasting much time has already been done by some one else, and it is of the utmost importance that they should discover this at the

earliest date in order that they may turn their attention as soon as possible to more profitable channels. This end is greatly promoted by the simple fact of having the material grouped together so that men can glance over it and get their eye on what has really been done. On the other hand, as a guide especially to men in looking over the field to see beforehand what fields are still comparatively unworked, this classification of books becomes of still greater importance to the progress of knowledge.

And what is true of trained scientific research I take is still more true of popular work—on the one hand, there is a great economy to the librarien who has to help in school work, essay work, club work, etc., in his task of hunting up references, and on the other hand, where there is access to shelves especially, there is the greatest educational advantage in the actual incentive to the reader to read or at least, what is of almost greater importance, browse through books in order to pick out certain things. The "average reader" will hardly study even a classed catalog, and is utterly at sea with an alphabetical list or an unclassified library. If, however, he can look over the shelves in a classified library he is surprised to find how much there is that is interesting, he learns to get facts that he wants more readily, and in the end saves much time for himself and for the librarian, while at the same time he gets far better cultivation in the same time than he could possibly have thought of getting in an unclassified library.

And besides this economy of time and labor there is a third advantage in classification, by no means to be despised, in the fact of the psychological or mnemonic training of those who, through seeing books arranged in certain classes, get in the habit of running over these categories in their minds and associating their own ideas in these classes. Men who are bound to make up such pigeon holes for themselves, otherwise there is no thought at all—they must make up for themselves some sort of schedules in which to associate their ideas together. The nearer these schedules approximate the real order of things, of course, the better it is, the more retentive the memory, the more intense the developed power of attention, but they must have the schedules, and any well thought out system of classes is better than the rubbish heap of odd boxes which serves most men in lieu of piegon holes.

The object of classification is thus economy and increased efficiency in the use of books. "Use" is the watchword of book-classification as "truth" or "true order" is of theoretical classification. Any variation whatever from the scientific order is permissible if so be it promote this end of use—the motive of the whole process is "getting together the books most used together."

But just here is a snag on which many have split, including the whole school of the go-as-you-please librarians who consider it very practical to make every petty little adjustment to temporary needs that they happen to think of when they think of it. It is also one which we must keep in mind in saying what we do most earnestly say, that any well-worked-out system is better than no system. The fact is that while it is true that any system is better than no system and even the artificial schedules of mnemonic subjects are a vast improvement over the common go-as-you-please schedule which every one makes up for himself, nevertheless it is true that the nearer classification gets, as a rule, to the real order of things, the more fully it serves the purpose of getting together the books that will be most used together, and especially of getting the ideas together which belong together. Thus those nearest right serve the purpose of use best. The nearer, too, the classification is to the real order of things the longer it will serve men's needs before breaking down. Men will surely cling for sound reason to a familiar and well established order just as long as they can and will not lightly give it up for a new one, but there must come a time for every system when, as of late in botany, the system long clung to must be given up because the new one has been clearly established as the real order.

Passing now to:

IV. THE KINDS OF BOOK CLASSIFICATION.

We have already spoken in the first lecture of the theoretical kinds of classification. The kinds of book classification are the same, but they have more concrete applications, combinations and variations. It will be worth while to note some of those which are more familiar in ordinary use. You have seen in use, *e g.,* (a) *the natural or logical classification*—books arranged in series according to degree of likeness, the ordinary form to which we refer in the use of the word. You have seen that classification arranged forward in an evolutionary form from simple to complex and also backward in the strictly logical form from the complex to the simple. You have seen the Baconian and the inverted Baconian.

You have seen also (b) the purely artificial *alphabetical system* where books are arranged strictly by author throughout the library as used to be the case in the New York State Library under an earlier administration.

I am not sure that I have ever seen (c) a strictly *alphabetical subject arrangement,* but we have often seen large subdivisions of a system arranged chiefly alphabetically by subjects. In fact, almost

all classifications have this element in it, as they usually reach sooner or later the point of arranging in the order of the "person biographed," and here it becomes a strict alphabetical classification by subjects.

In the same way again (d) the strictly *chronological* by periods throughout a whole library may not be exclusively applied anywhere, but it enters into almost all classification and is a legitimate principle in its place. This principle like all others is sometimes carried to excess, but it is hard to think of a system where at certain points the recognition of dates and periods is not a practical advantage.

(e) This is still more true of *geographical classification* which is still a favorite notion with many as a semi-universal principle. While this again may not be absolutely in use as an exclusive first principle, in many libraries there is a strong tendency to urge it as at least one of a few primary principles and to arrange, for example, things under Europe, History, Geology, Mining, Agriculture, etc., rather than under Geology, Agriculture, etc., with geographical subdivisions. As a subordinate principle it is of course in use in substantially every practical library system.

(f) The primary *division* of all books *by size* into three classes, folios and over, quartos, octavos and under, is one of the commonest of the older classifications, and even to-day we are obliged, for reasons of space, to observe it in a sense, though, as a principle of classification, it has practically gone out, and in libraries the principle of the "dummy" has taken its place.

Another artificial principle of arrangement which we have met is (g) the *arrangement by color.* This is ordinarily an *ex post facto* principle, and the colors are applied to the classes rather than the classes made an induction from the color. In this form it is common enough, *e. g.,* green books may be books on Greece, red books on France, etc. One can imagine a man arranging books in a private library on the strict principle of color for the sake of artistic effect, but I have never actually quite met it, although I fancy almost everybody makes some concession to harmony of color in a library with colored bindings not otherwise classified.

This classification by color differs somewhat from the principle of (h) *classification according to binding.* There are said to be known instances in which the principle of placing the best bindings nearest the door in a comprehensive series from the best bound to the worst was the actual ruling principle of the classification—and a most excellent principle it was in a library which, like one of these

that I knew, was perhaps more suited to be looked at than looked into.

You have of course heard also of the theological library where the ruling principle was (i) *orthodoxy,* the separation of the sound from the unsound—the sheep from the goats. What a chance by the way for the application here of the "mnemonic binding"—say, white, sheep; and black, goat; or blue, orthodoxy; and yellow, heretodoxy. This indeed is one of the earliest classifications of Christian theology. The ante-Nicene fathers divided their books into those "received" and "not received" and else "orthodox" and "heretical."

(j) The *form* principle of classification is also sometimes practically a universal first principle. It is used in fact in all systems where, *e. g.,* all encyclopædias are picked out from the other books in their subjects and it becomes a prime principle in the case of those libraries which put together all encyclopædias, including such as those of Medicine, Political Economy and the special sciences in a department of encyclopædias. The same thing is true in the matter of periodicals.

An example of what may be called (k) *classification by literary value* is the putting together of select books in a reading room. Another possible distinction is (1) classification according to *interest.* This usually has the utilitarian purpose of saving steps, but is illustrated by the putting out on special shelves of the latest books and the putting of fiction and biography and in general the most used books nearest the delivery desk. The principle of (m) *linguistic classification* is also much used. In the popular library this is liable to be a fundamental principle, books being arranged first of all according to language throughout, etc. This principle always comes in, too, at the point where we separate an author's works into editions and translations. (n) The classification which is *chronological by books* may arrange either in the order of their publication or of their accession to the library.

This list of kinds of book classifications in actual use might be extended still further—(o) *breadth* of book sometimes governs location, as in the case of oblong folios, (p) *thickness* even, in the case of broadsides and pamphlets generally. There is hardly a characteristic imaginable which may not modify the grouping on shelves at least: (q) *weight* (as in the case of inscriptions), (r) *fragility* (as in the case of papyri), (s) *financial value* (in the case of rare books), etc., etc. All these principles are not only in use but are legitimately in use, for it is the useful purpose which determines, and if in any case the most useful service which classification can perform for its users is, say, to separate the orthodox and unortho-

dox, then this becomes legitimately the prime principle, and after it, but only after it, the logical, historical, etc., principles may come in. It is clear therefore that the kind of classification to be used—judged by its leading principle—depends on the kind of use to which it is to be put.

This gives us a clue in the case of the special libraries, but what of the general libraries? What is the prime principle for them, and is there any order of subordination in the application of the secondary principles? With so many principles in actual use as dominating principles, is there any way of deciding when doctors disagree? I say yes. When doctors disagree we let some principle decide. In this case, as the first lecture tried to show, the fundamental law is the law of likeness. The order which dominates is the one which takes into account the greatest number of points of likeness, and in the use of subordinate principles the order of sequence in use depends on the same law. The true order, according to total points of likeness as here interpreted (whether interpretation is just or not each must judge for himself) is as follows: (1) The *logical order* or order of likeness of contents following the order of real things from the complex to the simple. This, which is the inverted evolutionary order, is on the whole better practically as well than the evolutionary or the order from the simple to the complex, because the most complex books containing the greatest variety of subjects should precede instead of follow their inclusive subdivisions in the book classification. Nevertheless in subordinate parts the evolutionary (or, what is identical, the "historical") order is often the more useful. (2) The *geographical order* or classification according to the position of things in space includes all kinds of things, though each at only a single instant of time. (3) *Chronological classification by subjects* indicates the position of only a single thing in space, though showing it at different instants of time. This exhausts the "natural" order. (4) The *alphabetical* now follows, taking up an artificial series at the point where the natural stops. It may be alphabetical by subjects or alphabetical by authors. (5) To this should be added, and ordinarily only after we have gotten past the alphabetical by subjects and the alphabetical by authors, a second artificial form, the *linguistic*. (6) Finally we have the *chronological by books* (not subjects), or the arrangement by dates or dates of first edition, of the works of any individual author in his particular language. This should only come in as a rule after others have been exhausted.

This I take to be the true sequence of principles as applied to a classification for any general library: Logical, geographical, chronological by subjects, alphabetical, linguistic, chronological by books:

e. g., History (logical or natural); France (geographical); the Revolution (chronological); Carlyle (alphabetical); French translation (linguistic); 1865 (chronological by books). Note that by chronological is here meant not the chronological by accession, which is a very common usage at this stage, but chronological by date of publication, which is a very different thing. The accession sequence only comes in where there are two books of the same date and hardly deserves to be called a "principle." We have here thus no less than six distinct principles of classification, all legitimately used in one system and all in use in most approved systems.

V. LIKENESS BETWEEN THEORETICAL CLASSIFICATION AND BOOK CLASSIFICATION.

Having defined thus the object and kinds of book classification, we return again to the prime object of the paper, which is to call attention to the differences between theoretical and practical classification and the adjustments of the former necessary in the latter. We must not forget, however, that the two things are essentially the same, and that the principles which guide in forming as well as the actual sequence of the theoretical order are to be regarded as the normal which hold except as they have to be modified by practical conditions.

Attention was called in the introduction to the first lecture to the meaning and laws as well as to the kinds of classification, universally considered. The same considerations as to the real nature of the act and the laws which govern the process hold in the formation and application of a practical book classification. Among these the chief thing to be kept in mind is the fact that the arrangement of your books as a whole and in detail is a discrimination of likeness and an arranging of the books according to likeness or unlikeness from the most complex to the simplest. There is no definition that was there given or law there defined which does not hold equally well for your book classification *as principles,* however much the application of them may consist of exceptions, and the quintessence of the whole is the *law of likeness* itself—especially the law of sequence from the like to the like-and-unlike, or vice versa. The principle of likeness and of sequence through the more to the less alike governs the whole process of practical classification; the order of the classes in the making of schedules; the preparing of notation, the plan of arranging the books on the shelves or the cards in their cases, and the actual practice of assigning of books to their places. It may be said therefore that theoretical and practical classification are abso-

lutely alike in their principles, however radically they may differ in their application to concrete things.

VI. DIFFERENCES BETWEEN THEORETICAL CLASSIFICATION AND BOOK CLASSIFICATION.

These differences may be roughly summed up as differences which come to light in making the schedules, in making a notation, in arranging cards. in locating books on shelves, in the practical work of assigning books to their classes. Under each of these classes variations arise, chiefly from the nature of the material and circumstances and the intended use.

1. *Making the Schedules.*

The basis of the schedules for book classification is of course the order and divisions of the sciences. It has already been said that in general the closer a classification can get to the true order of the sciences and the closer it can keep to it the better the system will be and the longer it will last. True as this is, it is nevertheless also true that there are many adjustments of the pure order of the sciences useful and even necessary in making the classes in book classification, and that the too wooden insistence on having the schedules follow the order of the sciences will often miss the real spirit of classification and result in putting books where a delicate common sense would not put them. In short, the common sense adaptation is often at bottom the more scientific.

(A). *Modification by circumstances.*

If you wish this expressed in technical terms I should say "variations arising from environment."

For most librarians the making of a classification is merely a selection of one already made. They make their schedules thus wholesale. An important question in the selection of such a ready made system of classification for any individual library is the question whether that system is actually much used. After all that I have said about conservatism and the petrifaction of ideas, I shall not be misunderstood in saying that the first principle in the construction (or choice) of a classification is a true conservatism. The very fact that a large number of people do think already in certain schedules, that large amounts of actual material have already been arranged in these schedules, is

in itself a reason for wise conservatism. This, you will note carefully, is especially true when the general spirit of the prevailing classification is not directly contradictory to the natural order. The great gain to librarians trained in one set of schedules or to users similarly trained, in being able, in passing from one library to another, to use the same system, is obvious. In cases therefore where the main classes do not overlap and contradict one another, and especially when the variations are merely matters of geographical order or personal taste, the giving up of a practical system actually in use for one ideally better is to be deprecated, except when the new is so markedly better that it is likely to command general use. For this reason the Dewey Decimal Classification, from the very fact of its wide use, will probably endure long after some of the systems now rising, which have more pretension to follow the true order of the sciences are dead (though having said this much it should be said also that the tenacity of the Dewey Classification is due even more to a certain versatility and hospitality towards adjustments within its limits). It is for this reason, too, together with the other very important circumstance that they are more fully worked out than others, that librarians generally, even those who like the writer have a special system better adapted as they think to their own libraries, always advise other librarians to "take Dewey or Cutter" rather than their own. What is true of a general system is true also of its parts, and one must take into account in any attempt to make a system, *e. g.*, the conventional divisions of Economics or Philosophy and the Hagenbachian divisions of Theology. The fact that men are in the habit of looking for things under certain heads is quite reason enough for a strict conservatism when there is question of changing to some other order.

(B). *Variation Arising From the Nature of Books.*

The order of things and the corresponding order of sciences follow naturally in their statement the order of progress from the simple to the complex, from the like to the like and unlike, from the less various, therefore, to the more various, from the less to the more inclusive.

The classification of books on the other hand does not in the first instance follow the historical order or order of complexity, but the inverse evolutionary order, the more to the less inclusive, the unlike to the like. It follows thus rather the order in which the human mind proceeds in tracing out the order of things than the natural order of things itself. If we were following the order from the less to the

more inclusive we would place, say, first treatises on individual animals, then treatises on a class of animals, then treatises on all animals, then on all living things, then on all things living and lifeless. This would be most awkward in practical classification, where we are accustomed to the idea that the whole should precede the parts. The awkwardness comes perhaps partly as the result of habit. Certainly it would look queer enough (although the matter is not wholly unprecedented) to put encyclopædias, essays and periodicals at the end rather than at the beginning of each class. It seems like standing a tree on its branches. But the reason for the queerness lies fundamentally in the fact of the composite character of books like encyclopædias which makes them "more complex" than any part and puts them logically after rather than before. In an inverted evolutionary order, however, this comes out right. While therefore it is of no very great practical importance in this matter whether we write backwards or forwards provided we get all the letters in their proper order, and while either method or a mixed method is proved to be practical in use, nevertheless at present writing I incline to prefer an order of Theology, Anthropology, Biology, Hylology, rather than Hylology, Biology, Anthropology, and Theology, but in this I do not feel very dogmatic.

(C). *Differences Arising From Intended Use.*

Again, the practical classification of books is conditioned by the kind of use which is to be made of the books. The kind of classification, *e. g.*, which is needed in a free public library is not necessarily the same in its details as that which is suited to a university library, although the general outline may be the same. The chief differences regard (1) the adjustment to building, (2) the principles of subdivision, (3) the question of degree and proportion in subdivision.

(1). Adjustment to Building.

The general order in which the main classes are to be placed with reference to one another in a library may not be so much determined by their natural relation as by the shape of the library building and by the rule that the most used books are to be placed nearest the delivery desk. Most public libraries keep fiction nearest the door. One famous library already mentioned and not wholly without its counterpart in others, classified its books so that the best bound ones should come nearest the door. This was correct. This being the chief use, the books were placed where they would be most used.

According to the law of use the books should be arranged from the most to the least used. In a reference library, therefore, where the reading room is at the top of the building, as will be the case in the New York Public Library, there most used classes should be nearest the top, and where, as is generally the case, the reading room is at the bottom, there they should be nearest the bottom. In case it happens to be a stack after Mr. Winsor's favorite scheme, exemplified in the Cambridge Public Library, where delivery desk is at the middle of three floors, then most used classes should be on the middle floor. In all circulating libraries the most used classes should be nearest the door. In an agricultural college, therefore, Agriculture should be nearest the desk, and in medical, theological, engineering, etc., schools the same law would prevail. In the Massachusetts Historical Society Library, Massachusetts history, and in the New Jersey Historical Society Library, New Jersey history would be nearest the desk. As a matter of actual practice, something like this is actually done even when the notation follows a different order. It is regarded as a small matter whether main divisions follow the notation order or not. It is this practice by the way which tends to remove the chief practical objection to the D. C. by allowing the 400s and the 800s to be put side by side.

(2). The Principles of Subdivision.

This question of the 400s and 800s in the D. C. is a good illustration of a possible modification of the scientific order by the law of putting together the books most used together. In some libraries "Language" and "Literature" are main classes and books are arranged under each in the order of languages. In other libraries "Language and literature" is one class divided by languages and then under each language again divided into "Philology and literature." This latter rather than the D. C. method is usually preferred in a college library according to the law of the most used, since a "department" generally is linguistic and the same professor handles both language and literature. This is typical of all branches in a college library where the department generally rules—and departments (strange as it may seem) by no means strictly follow the real order and divisions of the sciences. In each case, whichever order is finally pitched on, the ground of choice is, rightly, less the "real order" than the order in which the books are used together.

(3). The Question of Degree and Proportion in Subdivision.

This question is in brief the burning question of close or broad classification; or at least the question which once was burning—the question, in other words, whether classification distinctions shall be carried beyond the limit even of the minutest subdivision of the sciences or shall be limited to the most general schedules. The controlling law in the matter is the principle of usefulness and the general rule is "the greater the number of different books the closer the classification." So long as there is only a shelf-full or two, a class subdivision is of little importance; when there are a hundred or two shelf-fulls it becomes a matter of great importance. It follows therefore that every library feels this need of minute classification in its specialties and can be satisfied with broad classes in the rest. Thus the Halle Library devotes about one-third of all its schedules to a very minute subdivision of Law. In the same way we at Princeton wish to use three times as many prime schedules for New Jersey history as we do for the history of any other state, and fifty times as many for the United States as for Holland. The library of a zoological museum really needs to follow the scientific subdivisions of animal classes to the very farthest sub-class, but it may arrange such botanical works as it happens to have in a very few classes. The proportion in subdivision therefore depends on the kind of books that the use of the library calls for. That this proportion would be, in a general classification, a pretty hard thing to judge, is witnessed by Dr. Wire's complaint against the Decimal Classification, that it gives 100 places each to Philosophy and Theology where they should be joined in one! There are still, probably, as many books on theology in existence as on all the other sciences put together, and for a universal system surely one-tenth of the schedules is none too many.

The question of degree of subdivision is really included in what has been said. No general scheme of classification has ever been carried out in all its parts to the minuteness with which these parts have been carried out in special libraries. I doubt if 100,000 schedules would do this. As a rule the best general systems carry to about 10,000 places, and the question over which dispute has raged so violently may fairly be said to reduce itself to a question, between 100, 1,000 and 10,000.

I hope that we are now agreed on close classification, but for fear that we may not all be fully persuaded, a word or two more on the matter. The practical use of the broad classification is simply to help a man who wants a specific book and has access to the books

to go somewhat more quickly to that specific book in a broad class by beginning the alphabetical arrangement by authors earlier. But this help would be a greater one still if the whole library were arranged alphabetically, and this I take to be the inevitable logical end of a refusal to carry close classification to a somewhat extreme degree of minuteness. As a matter of logic, too, if the broad classifier is consistent he must not even arrange by authors under one of his broad classes (for that is making alphabetical classes) but must leave helter skelter. In reality the broad classifier is as close as the closest and differs merely in insisting that the logical subdivision according to likeness shall be abandoned for an artificial division according to name, size, color, or what not, at an earlier stage than his "close" adversary. For my own part I see no good scientific reason, and indeed no practical reason, why, even for a small number of books, it is not better to have the most minute logical subdivision, providing there is a good index to the classification and an author index to books. All the books of a given subject are together just the same in the close as in the broad,and at least in the cases where you are after the more specific subject you make a great gain through getting the greater bulk of material together at once, whereas on the other hand, if you are referring to a specific book, the reference from catalog to this book is just as specific, and there is no loss. The rule of this matter seems to me to be to carry classification to the last degree of real natural likeness, and as much farther in the various artificial forms as the special conditions of the library require, but the "broad classifier" will, if he thinks it more useful, properly increase or diminish the natural subdivisions according to the special needs of his library.

2. *Making a Notation.*

A notation is simply a shorthand series of names for classes. There are three methods which may be distinguished among attempts at a representation of the whole of things: (1) The systematic encyclopædia, which attempts to give a description of all things in a form more or less full of detail as the case may be, from a complete treatise down to the barest definition. (2) The "system of classification" with which we librarians are familiar, which gives the same outline, but defines each class by a single word only or a phrase at most. (3) The "notation" which is really a condensed word for each class, but which nevertheless may and should convey a representation not merely of the division, but also of the sequence,

and not only of the artificial sequence, but of the logical sequence, so far as it can be expressed.

In preparing a notation therefore the logical and mnemonic element is of prime importance. This element may exist either with the alphabetical or with the decimal or with the mixed system of notation. It cannot so well exist with the consecutive whole number and does not exist at all in the notation which is mnemonic in the sense of beginning with the first letters of the *name* of the class—the system which is, I believe, in use in the Sorbonne, and in some American libraries, and which has been accepted by Mr. Langton and M. Maire.

It is not a part of the plan of this lecture to go into the discussion of the various combinations which serve as notations, except to say that the idea of a notation seems to be one distinctly numerical, and that every practical system sooner or later does make use of both letters and figures. It is only a question of at which end or where in the middle the letters shall go, and whether the figures shall be decimal (*i. e.*, logical) or consecutive, Roman or Arabic. As a matter of personal opinion, I hold that a classification should be strictly logical throughout in one series with decimal notation, but that where portions of the library must be differentiated into separately located collections of Reference, Kept books, Mss., etc., this should be so done by the prefixing of letters. Theoretically, however, one may hold himself free to introduce his new symbol at any point whatever in his number. It is a matter of practical judgment as to whether points shall be introduced after three figures or four figures, or whether the decimal series shall be broken up after certain distance or not, *e. g.*, by introducing the initial letter with the author number, as in the Cutter table, or keeping the decimal still with authors, as we do. However that may be, the strictly logical notation must be broken at times by the need of separating certain classes of books from their logical order and indicating this difference in the notation.

The choice of notation again is limited by the ability of the users, and what will pass well in a learned library may not do so well in a popular one. Theoretically therefore one may use Roman, Italic, Greek, Hebrew and what not letters, Roman and Arabic numerals all together, and there are systems which attempt nearly all, but practically the simpler a system is the better.

3. *The Classification of the Card Catalog.*

The practical adjustments required for use are less in card

classification than in the actual location of books on shelves, simply because the list of the contents of books can be broken up on cards while the books themselves cannot. It comes therefore near to being the science of which book classification is the art. Books are in card catalogs resolved into their elements in some sort as molecules into their atoms by the chemist. This breaking up is, however, only relative and partial—no one, *e. g.*, analyzes an encyclopædia in the general catalogs or wants to. The catalog would get altogether too cumbersome. Moreover, the breaking up must still leave unbroken sections, and is rather the breaking of rocks into fragments than resolving them chemically into their elements, as has been already suggested. The variations are at bottom, therefore, the same as in book location, though less marked.

4. *The Classification of Books on the Shelves.*

The actual putting together of books in groups on the shelves is conditioned practically in the first place by the heterogeneous character of many books, such as encyclopædias, essays, periodicals, etc. There are those who on a small scale go so far as to attempt to break up their periodicals and to classify the individual articles, but this scheme cannot be carried very far. Books must, as a rule, be handled as a whole just as the physiographer handles his conglomerate mass, not as the chemist who resolves his into the individual atoms.

A second practical conditioning of the classification of books on the shelves is the matter of size. I have gone so far as to stand up the Paris Polyglot beside the little Stevens edition, but the most fanatical advocate of complete sequence on the shelves would not dare put some elephant folios that you have seen next to the Pickering classics. There must be a limit somewhere. This does not necessarily affect the schedules; it need not even affect the notation, although it generally does so. The user must simply know that he must go to two or three series of books instead of one series in order to completely exhaust the material of his subject, and the modern system of "dummies" even saves him much of the need of this, and he need only examine one series in nine cases out of ten, if he is tolerably familiar with the bibliography of his subject. At the very best, however, the size does limit the actual putting of all books together in their "natural" order.

This same thing is true where books of special value, or books considered unsuitable for general reading on account of immorality

or (in special libraries) unorthodoxy, have to be locked up behind the scenes. The theoretical order is practically disturbed.

5. *The Putting of the Books in Their Classes.*

By this is meant the actual work of classification on the part of the classifier. Even at this stage, after the schedules, the notation and all the rules for location have been well settled, the need of adjustment of the theoretical to practical use continues. If, for example, a university has a Department of Economics and no Department of Agriculture, why, then, should a book on agricultural prices be placed the whole distance of the library away from Economics under Agriculture, instead of under Agricultural production in Economics? Yet in a university with an agricultural department it might be much more important under Agriculture than under Production. In the same way a book on railways in all their aspects in a technological school might belong under Engineering, and in a business college under Business, and in an arts college under Economics.

It is just such common sense adjustments as this which test the mettle of the classifier, and it is the fact of this need which makes the really good classifier so rare.

If it were possible to make classification in such way that a mechanical application would provide for all cases it would be another matter. As it is, the variety is endless and the thing to be remembered is that the controlling law for all variation is the law of *use.* Add to this the fact that the prevailing law of all normal classification is *likeness,* and you are (theoretically) pretty well equipped for your work.

By this law of likeness is meant chiefly that law of systematic progression from the like to the like, and unlike which we have called progress in complexity. The whole art of classifying in a nutshell lies in the ability to discriminate the like from the unlike, the less from the more inclusive. It is intended to suggest that the fact that classification is by nature a putting together of like things makes this idea of "likeness" the prevailing idea to be kept in mind in every aspect of the process.

VII. CRITERIA OF A PRACTICAL BOOK CLASSIFICATION.

What, then, are the criteria of a good classification for books?

1. It should follow as nearly as possible the order of things. A properly classified library is perhaps the nearest thing that there is

to a microcosm. A human mind which knew all things might be more perfect in this regard, but in reality no one can or does keep the whole of things in mind as a library does. It must therefore follow the order of complexity or of history, or, if you please, of evolution.

2. It should be carried out in minute detail.

3. It should be provided with a notation which will allow for indefinite subdivision, using mixed symbols, but with a predominant decimal base.

4. It should be provided with a detailed and specific index.

5. The value of such a system is increased in direct ratio to the generalness of its use.

How do existing systems answer these requirements? The Halle system is disproportionate and its notation entirely too complex; but it is in some respects the most logical of leading systems. The system of Bonazzi is too brief and broad, and its notation is not satisfactory. Rowell's University of California system is also too brief, and its notation cumbersome for interpolation. But it is sensible in its order and division. Practically speaking, the Decimal Clasisfication and the Expansive Classification are the only ones of considerable extent which can be counted finished, and the E. C. is still a little short of that. In the matter of criteria of use, complete indexing and general practicality, the D. C. is of course without rival. It is somewhat out of proportion at certain points, but perhaps not seriously so. Its general order, though in many classes admirable, is less satisfactory logically on the whole than either the E. C. or the Halle sytsem. The E. C. is sensible, logical, applies a predominant alphabetical notation with great success, is well indexed up to the sixth expansion and is coming to be a good deal used. The final expanison, so far as it has gotten, is a monument of patience and adequate scholarship, and demonstrates, as it has never been shown before in any system, that the alphabetical base is a truly logical and very flexible base. As classification itself is the highest function of the librarian's work, calling into play every faculty and every attainment of knowledge—the acme of bibliothecal work—so these two systems of classification mark the high water line of American library science and are the climax of its achievement.

VIII. CONCLUSION.

Do you ask what then is left of the theoretical order after all these modifications? That is the question which we used to ask of our Latin grammars. Is the "rule" anything but a hook on which

to hang the exceptions? To this question I answer that the theoretical order is yet the rule, however many exceptions there may be. It is the guide, master, and familiar in every act and thought. It is the norm by which every application is tested, every variation judged. It is in short the soul of that complex body, often curiously modified by its attempt to adjust to environment and sometimes sadly twisted and deformed by unfortunate accidents, which we call practical classification. Please remember that I am speaking not so much now of that theoretical order which I myself have worked out in these lectures, and which may or may not be a contribution to the matter, as of the theory which underlies the Dewey and the Cutter system with which you have most to do. Every system has its theory of order, and with whatever system you have to do, whether anything that is now or something which you or some one else shall make, the more thoroughly you understand and the more steadily you keep in mind the theory which underlies, the better you will be able to make those little adjustments which you inevitably must make of any system and the more easily and satisfactorily you will be able to put the books into the classes of that system.

APPENDIX.

SYSTEMS OF CLASSIFICATION.

I. METHOD.

THIS appendix is to be regarded as illustrative of the lectures rather than as a monograph. It aims to furnish a bibliographical guide for the student of classification, especially for the library school student, and its method looks chiefly to the exhausting of the most accessible sources in such way that the student may feel that he has references to information on all the most generally recognized systems, rather than the information itself. Brief outlines are, however, given of a few systems and longer ones of a very few systems significant practically at the present time, and there is rather a large amount of matter which may be called original in that it is not contained in any of the usual sources and has not before been incorporated in the literary "tradition" of the history of classification. While, therefore, the matter has not been carried to a final degree of scientific precision, it is what may be called a "rough" or "trial" bibliographical history of classification. The chief "roughness" lies in the fact that many references, taken from secondary sources, are unverified, as it seemed more important for the purpose to get the material together and in shape for use than to attempt an accuracy which would require a long postponement of publication. A good deal of the matter, however, is actually from the original or has been verified by the original, and this applies to almost every one of the significant systems.

The plan has been to include all systems recognized in the histories of classification without much regard to their value, but, in the supplementary matter, to introduce only those which for one reason or another are of some historical significance. The list could, of course, have been greatly increased by the introduction of mere variations or insignificant schemes, and some of more or less importance may have been omitted by inadvertence, but in general if omitted the system may be counted obscure or unimportant.

In the bibliographical references some special pains have been taken to indicate at least one place where the outline of the system may be found.

In dating the systems the date of first publication is the basis, but in the case of libraries where the system has been long in use

before the first memorandum of publication (British Museum) date of first use is given. Owing to the fact that the form of classification often changes in various editions it is necessary to remember that the outline when given is not always either the earliest or latest form.

II. CLASSIFICATION OF CLASSIFICATIONS.

Systems of classification, or as they used generally to be called "bibliographical systems," are chiefly of five kinds: (1) The philosophical, or scientific—those concerned abstractly with the order of the sciences or the order of things; (2) the pedagogic, or those constructed with reference to courses of education; (3) the encyclopædic, closely resembling in aim the pedagogic, but intended to include some material as well as outline; (4) the bibliographic, or those suited to the arrangement of titles of books in a bibliography; and finally (5) the systems for classifying books on the shelves of a library, which, if you need a technical name, may be called "bibliothetic." The first three may be regarded as coming under the heading of the theoretical, in that their authors are free to arrange the subjects at will according to their ideas. The two latter belong to practical classification, in that they deal with masses which are already concretely formed, and they must therefore be adjusted according to the nature of this material. The classification of titles or the bibliographic is more flexible than the "bibliothetic" in that it does not have to take account, in the location of titles, of size, shape, material, etc., as in the case of library classification.

III. LITERATURE REFERRED TO.

It is usually a matter of surprise to the new student of classification to find how many systems have been proposed and especially how many times their history has been written, more or less fully. Following is a list of those sketches chiefly used in this appendix as being the most comprehensive and accessible to the student.

ACHARD, C. F. Cours élémentaire de bibliographie. Marseille, 1806-7. 2 v., 8°. [Not seen recently. Quotations made from Petzholdt.]

AMERICAN LIBRARY ASSOCIATION. Reports on classification of Larned, 1882; Lane, 1885; Bliss, 1889; Nelson, 1894; Wire, 1898; in the Proceedings as published in the *Library Journal* for the respective years.

BAIN, Alexander. Classification of the sciences. In his: Logic.

N. Y. (1886) 627-639 (Appendix A). [A considerable number of philosophical systems with good critical discussions.]

Bostwick, Arthur E. The American public library. New York and London, 1910. 12°, p. 152-67 (Ch. 12), Classification.

Brown, J. D. Manual of library classification and shelf arrangement. Lond., 1898. 12°. [Valuable as bringing up to date and introduces some new-old systems but does not treat old exhaustively.]

Brown, James Duff. Guide to librarianship. Lond. 1909, 12°, pp. 24-31. [This compact series of bibliographical references, gives excellent select lists on all aspects of the subject. Note additional articles by Anderton, Jast, McKnight, Mould, Savage, Sayer and Wilson (p. 29). Note also the selection of works on logic, and some practical systems designed for readers under (5).]

Brown, James Duff. Manual of library economy. Revised edition. London, 1907. 12°, p. 187-202 (Ch. 14). Systematic classification schemes; pp. 184-6 (Ch. 13) General principles. [Outlines of the adjustable, expansive, decimal and subject systems.]

Brown, James Duff. The small library. London, 1907, 16°, p. 79-88 (Ch. 7). Classification.

Cannons, H. G. T. Bibliography of library economy. Lond. 1910, 8°, pp. 320-39 (class H). Classification. [Periodical articles only but a most admirable classified list of such articles from all the leading professional periodicals. It is the classification of the one thousand (more or less) entries which gives special value to this exhaustive list.]

Cave, Alfred. An introduction to theology. Edin., 1896. 8°. pp. 68-80: Place of theology in the classification of the sciences. [A few well handled theoretical systems.]

Clarke, Adam. Bibliographical systems. In his: Bibliographical miscellany. Lond., 2 (1806) 198-218. [Few but detailed.]

Clarke, Archibald. Some old treatises on libraries and librarian's work. In: The Library 10 (1898) 327-9; 385-95. [Few.]

Classification Schemes. In: The Library 9 (1897) 203-6; 10 (1898) 97-100; 162-3. [Several of standard systems in outline.]

Collan, K. Om bibliografiska Systemer och Bibliotheksmethoder. 1861. 8°.

"A sort of extract" in Neuer Anzeiger (1862) 360-4. [This extract is the source quoted in this appendix. Original not seen.]

Petzholdt (1866) 21 (full title and memorandum of systems included).

Constantin, L. A. Bibliothéconomie. Paris, 1839. 8°, also 1840; tr. German 1840, also 1842; tr. Spanish 1864. [Ed. quoted is the German 1842 refs. as given by Petzholdt.]

Dana, John Cotton. A Library Primer. Fifth and revised edition. Chicago, 1910. 16°, p. 84-96 (Ch. 20). "Classifying books," Dewey system, Cutter system.

Delisle, Léopold. Instructions élémentaires et techniques pour la mise et le maintien en ordre des livres d'une bibliothèque. Ed. 4e, revue. Paris, H. Champion, 1910. 94 p.

Denis, F. et al. Nouveau manuel de bibliographie universelle. Paris, 1857. 8°. v. 1, pp. x.-xvi. [Reprints from the Neuer Anzeiger. Not seen.]

Edwards, Edward. Memoirs of libraries. Lond., 1859. v. 2, pp. 761-831, with two folding tables, Classification systems. [Admirable full and useful survey.]

Faucheux. In: Bulletin du bibliophile. iv. 13 (1841) 565-73. [French only according to Petzholdt. Not seen.]

Fiske, John. Outlines of cosmic philosophy. v. 2. Bost., 1875. 8°. pp. 188-233, Organization of the sciences. [Comte and Spencer.]

Flint, Robert. Classification of the sciences . In: Presb. R. 6 (1885) 401-35; 7 (1866) 483-536. [Admirable and thorough critical survey of a large number of philosophical systems. With Shields, best source for theoretical systems.]

Flint, Robert. Philosophy as Scientia scientiarum and a history of classifications of the sciences. New York, 1904. 8°. [A more extended and still more admirable critical survey than the article of 1885. It is brought down to 1899. It supersedes all other sources for theoretical systems].

Focke, Rudolf. Allgemeine theorie der klassifikation und kurzer entwurf einer instruktion für den realkatalog. Festschrift zur begrüssung d. 6. vers. deutsch. bibliothekare 1905. p. 5-18. [compare also his Classification: The general theory, read at St. Louis conference. Lib. J 29 (1904) supp. 127-32.]

Fumagalli, Giuseppe. Sistemi di collocazione praticati nelle diverse biblioteche italiane e straniere. In his: Della collocazione dei libri nelle Pubbliche Biblioteche. Firenze (1890) 91-153. [Excellent. Many suggestive outlines and specially interesting as dealing somewhat with notations. Admirable method and proportion. Makes the best supplement to Petzholdt.] Compare also his Cataloghi di Biblioteche, 1887, 1, 33-76.

Gar, Tommaso. Rassegna di sistemi biblografici in ordine cronologico. In his: Letture di Bibliologia. Torino (1868) 257-281. [A considerable number but not many full outlines.]

GRAESEL, Arnim. Grundzüge der Bibliothekslehre. Lpz., 1890. 12°. pp. 152-5, 384-8. [Excellent. Very brief and compact enumeration of perhaps thirty or forty systems, including a few partial systems which do not come within the scope of this appendix.]

HORNE, Thomas Hartwell. General treatises on libraries and systems for classifying books. In his: Introduction to the study of Bibliography. Lond., 2 (1814), 554-563. [Seldom gives outline.]

HOTTINGER, Joh. Hen. Bibliothecarius quadripartitus. Tiguri, 1664. 8°. pp. 79-88, [Topothesia libraria sive] methodus disponendae et distribuendae bibliothecae in locos communes, etc. [Of considerable value for older systems.]

KEPHART, Horace. Classification, in: U. S. Commissioner of Education. Report for 1892-3, Ch. IX. Papers prepared for the world's library congress, pp. 861-897.

LEGIPONTIUS, Oliv. De adornanda et ornanda bibliotheca. Norimb., 1747. sm. 4°. pp. 44-51, De rei librariae dispositione. [Of considerable value for older systems.]

LYONS, P. A. Encyclopædia. In: Enc. Brit. 8 (1878) 190-204. [Admirable survey of encyclopædia systems.]

MAIRE, Albert. Des systèmes bibliographiques. In his: Manuel pratique du bibliothecaire. Par. (1896) 181-248. [Largely supplementary to older surveys. Many new systems and many of these in fairly full outline.]

MARTEL, Charles. Classification: present tendencies. Lib. J. 29 (1904) supp. 132-4.

MIRA, Giuseppe. Diversi sistemi bibliografici tenuti dai signori Ameilhon, Camus, Achard, Peignot, Debure, Barbier, Brunet, etc. In his: Manuale teorico-pratico di bibliografia. Palermo, 2 (1862) 121-140. [Fair but with Fumagalli, easily dispensed with.]

MOREL, Eugene. Bibliothèques...2 (Paris, 1908) 225-272 (Ch. vi) Classements; (Ch. vii) Essai de classement réaliste.

OTTINO, Giuseppe. Sistema bibliografia. In his: Bibliografia. Milano (1892) 119-147. [A few select only.]

PEARSON, Karl. The grammar of science. Lond., 1900. 8°. pp. 504-532, The classification of the sciences, [Bacon, Comte, Spencer.]

PEIGNOT, G. Système bibliographique. In his: Dictionnaire raisonnè de bibliologie. . Paris, 2 (1802) 200-281. [Good descriptions with frequent rather full outlines.]

PETZHOLDT, Julius. Bibliographische systeme. In his: Bibliotheca bibliographica. Leipzig, (1866) 20-65. [113 systems with full

titles and outlines. The best general survey to his date and still the best for the period before 1866.]

PETZHOLDT, Julius. Chronologische Uebersicht von bibliographischen Systemen. Separatabdruck aus dem Neuen Anzeiger für Bibliographie und Bibliothekswissenschaft. Dresden, 1860.

PURNELL, H. R. Development of notation in classification. Lond. 1911 [Library assistants' Assoc'n series No. 3].

RIDER, Arthur Fremont. Old classifications—and the excuse for new ones. Lib. J. 35 (1910) 387-396.

ROGERS, Watler, Thomas. Bibliographical systems. In his: Manual of bibliography. Lond., (1891) 129-148.

ROUVEYRE, Edouard. De la classification systèmatique des livres. In his: Connaissances nècessaires à un Bibliophile. Par., 2 (1882) 1-66. [Few but some very full outlines.]

SHIELDS, Charles W. Philosophia ultima, or science of the sciences. v. 2. N. Y., 1889. 8°. pp. 52-79. [With Flint the best source for theoretical systems.]

TAYLOR, Henry Osborn. The mediaeval mind. Lond. 1911, 8°, v. 2, pp. 311-29. Philosophic classification of the sciences [Discussion of Vincent, Peter Lombard, Aquinas].

Of these Petzholdt (113 titles) is best as far as he goes; and among the more modern Fumagalli, Maire and Brown are of primary value for book systems, Shields and Flint for theoretical systems.

This list by no means exhausts the number of sources even of those which the author has now at hand (*e. g.*, Michael Denis, Greenwood's Public libraries, various articles on Encyclopædia, etc.), but so far as he can judge, there is little new material in other sources.

NOTE.—Of fourteen titles added above in this reprint, Brown's Guide and Cannon's Bibliography with the book of Flint cover the various aspects most completely. Many more additions might have been made and many very excellent titles have been omitted simply because they are given in the fourteen titles cited. The literature of classification in its various aspects has been very large during the past ten years.

IV. THEORETICAL SYSTEMS.

It may not be too far fetched to say that the history of theoretical classification began with the division of knowledge into the knowledge of good and the knowledge of evil, in which case Eve's tree would rival the famous tree of Porphyry, and the origin of all evil

would apparently be traced to the effort to convert theoretical into practical classification.

However this may be, the art of classification came in with the very first exercise of human thought. Whether Adam's naming of the animals (which was in the strict sense an act of practical classification) was historical or not, it is almost certain, from the nature of human thought, that the very first act of man as distinguished from his act as ape (if he was one) was one of classification. This act of classification made the ape a man. Before it he was ape, after it man. Human thought, as distinguished from animal thought, seems to lie in just this power of binding things together in a group according to their likeness and unlikeness and keeping clearly discriminated on these lines.

If by history, however, we mean what is alone history in the modern sense—a genetic relationship in which the influence of former on later systems can be traced—then the history of theoretical classification only begins with Aristotle or perhaps Plato, but from this point on may be traced with some definiteness.

B. C. 428-347. *System of Plato.*

PLATO. Republic bks. 3 and 7.

Cicero. Academicorum lib. 1, 5, ed. Muller. Lips., 1889, p. 10 ("1, Life and morals, 2, Nature, and 3, Discussion.") Sextus Empiricus. Adv. Math. 1, 7, 15 ed. Bekker (Berl., 1842, 193-4.) Flint, in: Presb. R. 6 (1885) 405-9; Shields, Philos. Ult. 2 (1889) 55.

Flint rejects the division usually attributed to Plato of "dialectics, physics and ethics" and finds the only authority for it in the testimony of Sextus Empiricus, who says (p. 193) that Plato was probably the father of those who divide into Physics, ethics and logic "since he discoursed concerning many physical and ethical and not a few logical subjects." Flint overlooks the fact that Cicero recognizes almost precisely these divisions, but may nevertheless well be right in thinking that Plato did not use them since Diogenes Laertius says that Zeno was the first to use them. Flint gives a survey of Plato's "systematic distributions of knowledge," which abridged runs as follows: Visible world including things and images of things, intelligible world including conceptions (Arithmetic, Geometry, Astronomy, Harmonics, Ideas, dialectic.) It might be quite as just to represent this system, as given in the Plato Republic Books. 3 and 7 as follows: Useful arts, Music, Gymnastics, Mathematics, Dialectics.

B. C. 384-322. *System of Aristotle.*

ARISTOTLE. Metaphysics 5.1.2; 5.1.4; 7 (8).1; 10.7.2; 10.7.4. Ethics 6.3-8. Politics 5 (or 8) 3 (or 2.3).

Cave. Introduction p. 70; Flint, in: Presb. R. 6 (1885) 409-13; Shields, Philosophia Ultima 2 (1889) 55-56 (outline.)

Artistotle divides [Met. 10.7.2 ed. Christ. Lips. 1895, p. 232 (1064 a 16-17) also 5.12 ed. Christ, p. 125 (1025 b 25)] into practical productive (poietic) and theoretical. The theoretical or speculative again he divides [Met. 5.1.4 and 10.7.4. (ed. Christ 1026 a 18-19; 1064 b 2] into Mathematics, Physics (or Natural Philosophy) and Theology (or Metaphysics).

If one may, as has been done, classify the five intellectual virtues (as Ethics 6.3-8) as Theoretic=Wisdom=Science and intuition, Practical=Prudence and Productive=Art we have the following outline of Aristotle's system:

Practical or Ethics:
- Economics.
- Politics.
- Law.
- Politics proper.

Productive or Creative Art.

Theoretical:
- Mathematics.
- Physics.
- Theology (or Metaphysics).

To this should be added the fact that in his Politics (5 or 8.3 ed. Christ, p. 166) treating of the teaching of children, Aristotle gives the curriculum as Grammar, gymnastics, music and "according to some" "graphics."

B. C. 366-264. *System of Zeno.*

ZENO OF CITIUM. On Reason.

DIOGENES LAERTIUS. De vitis philos. 7:33. (Tauchnitz, Lips., 1833) 18-19.

Flint, in: Presb. R. 6 (1855) 413-15; Shields, Philos. Ult. 2 (1889) 56.

Logic, Physics (Natural philosophy), Ethics. Zeno was the first to make this division, according to Diogenes Laertius, and was followed by Chrysippus, Apollodorus, Syllus Endromus, Diogenes the Babylonian, Posidorus, although some, with Diogenes of Ptolemais,

put Ethics first, with Apollodorus put Ethics second or with Panaetius and Posidonius begin with Natural philosophy. To this list the name of Philo at least should be added among those who put Ethics first, and Plutarch with those who arrange as Physics, Ethics, Logic.

B. C. 347-339. *System of Speusippus.*

DIOGENES LAERTIUS. De vitis philosophorum, cf. Themistii Paraphrases Aristotelis, ed. Spengel (Lips. Teub. 1866) 92 l. 15.

According to Diogenes Laertius on the authority of Diodorus, Speusippus was the first man to maintain the connection of the several sciences with one another. He was therefore if this be true the father of scientific classification. His system was probably the prevailing Dialectics, ethics and physics carried out quite minutely into subdivisions. But cf. Plato Rep. Bk. 7 on the "intercommunion" and "Natural relationship" of studies which dispute this, and also cf. Aristotle, who has more claim to the title of paternity.

B. C. 339-314. *System of Xenocrates.*

SEXTUS EMPIRICUS. Adv. math. 1.7. 147 ed. Bekker. Ber., 1842, p. 223.

The sensible, the intellectual and the conjectural.

B. C. 263. *System of Cleanthes.*

DIOGENES LAERTIUS. De vitis philosoph. 7.33 (Lips. Tauchnitz, 1833) 19.

Six divisions: Dialectics, Rhetoric, Ethics, Politics, Physics, Theology. He seems to have been followed by Zeno of Tarsus and others.

B. C. 116-27. *System of Varro.*

LIBRI novem disciplinarum cf. Ritschl, Fr. De M. Terentii Varronis disciplinarum libris commentarius. Opuscula 3 (1877) 352-402 esp. 371.

Flint, in: Presb. R. 6 (1885) 415 (The seven liberal arts, medicine and architecture); Shields, Philosophia Ultimo 2 (1889) 56.

Grammar, Dialectics, Rhetoric, Geometry, Arithmetic, Astrology, Music, Medicine, Architecture.

B. C. 25-A.D. 39. *System of Philo.*

PHILO Judeaus. De congressu quaerendae eruditionis gratiae. Opera 3 (Lips. 1828) 70-108 passim.

The encyclical studies are handmaids to Philosophy and include Grammar (reading, writing, literature and history), Geometry, Astronomy, Music, Rhetoric, Logic, Dialectic.

23-79 A. D. *System of Pliny.*

C. PLINI Secundi Naturalis historiae libri xxxvii, ed. Sillig, 1 (Hamb. 1851) 1-100.

Lyons, in: Enc. Brit. 8 (1878) 191 (outline.)

Pliny's order follows the line of: The Universe (Astronomy), The Earth (Geography), Man, Animals, Plants, Agriculture and horticulture, Medicine, Metallurgy, Art.

35-95. *System of Quintilian.*

QUINTILIANUS. Inst. 11.18.1, ed. Bonnell (Lips. 1882) 98-9.

Q. divides into Theoretical, Practical and Productive (or poietic.)

BEFORE 305. *System of Porphyry.*

PORPHYRIUS. Introduction to the Categories of Aristotle.

Jevons, W. S. Principles of Science (N. Y., 1875) 381-6 (tabular outline); Bain, Logic (1886) 716-7. ("Body, animated body, animal, rational animal, man.")

This became the "truee" or "ladder" of Porphyry or the "Ramean tree" given with variations by many mediæval writers; *e. g.,* Nicephorus, Aquinas, Roger Bacon, etc.

Roger Bacon's form of representation of the order of substance may be taken as practically identical with Porphyrys's ladder and is a most interesting suggestion of the modern evolutionary order. It may be represented as follows:

Substance.
  Spiritual.
  Corporal.
    Celestial.
    Terrestrial.
      Elementary.
      Mixed.
        Lifeless.
        Living.
          Vegetable.
          Animal.
            Irrational.
            Rational.
              Man.

354-430. *System of Augustin.*

AUGUSTINUS, Aur. De Ordine II 12- ed. Migne. Patrol. lat 32 (1865) 1011-13; also Retractiones , do. 591 (Grammar, Music, Dialectic, Rhetoric, Geometry, Arithmetic, Philosophy); also De doct. christ. do. 3:57-66 ("quas liberales vocant.")

Schaff, Ph. Theol. propaedeutic. N. Y., 1894, p. 7; also Hist. of Church 4:611-.

BEFORE 439. *System of Capella.*

CAPELLA, Martinus. Satyricon [or De septem artibus], ed. Kopp. Frf.a.M. 1836. 4°; ed. Eyssenhardt. Lips. 1866. 12°.

Lyons, in: Enc. Brit. 8 (1878) 191; Flint, in: Presb. R. 6 (1885) 415; Shields, Philosophia Ultima 2 (1889) 56-7; Teuffel, Hist. Rom. Lit. 2 (Lond., 1892) 446-9.

Grammar, Dialectic, Rhetoric, Geometry, Arithmetic, Astronomy, Music. He also mentions, but counts out from among the liberal arts, "medicine and architectonics."

ABOUT 550. *System of Cassiodorus.*

CASSIODORUS. De artibus et disciplinis liberalium litterarum. In: Opera ed. Migne 2 (1865) 1150-1218.

Flint in: Presb. R. 6 (1885) 415-6 (Trivium and quadrivium, known also as Logica and Mathematica and correspond to Logic and Physics of the Stoics); Shields, Philos. Ult. 2 (1889) 57.

Arts:

Grammar.
Rhetoric.
Dialectics.

Mathematics:

Arithmetic.
Music.
Geometry.
Astronomy.

This is the famous "trivium" and "quadrivium" of Mediæval education.

636. *System of Isidore of Seville.*

ISIDORUS HISPALENSIS. Origines sive Etymol. Lib. I. Cap. II., ed Migne, Patrol, lat. 82 (1878) 74.

Lyons, in: Enc. Brit. 8 (1878) 191 (outline); Flint, in: Presb. R. 6 (1885) 416 (Men. same as Cassiodorus); Shields, Philosophia Ultima 2 (1889) 57 (mention.)

"Seven liberal arts." 1, Grammar; 2, Rhetoric; 3, Dialectic; 4, Arithmetic; 5, Music; 6, Geometry; 7, Astronomy.

673-735. *System of Bede.*

BEDE. Opera didascalia. Ed. Migne, Patrol. lat. 90 (1862) 123-606. Flint, in: Presb. R. 6 (1885) 416 (Men. same as Cassiodorus); Shields, Philosophia Ultima 2 (1889) 57 (mention.)

Besides works on orthography, metrics, etc., Bede's work On the nature of things treats of the formation of the world and its nature, of the elements and then of what may be called astronomy, meteorology, oceanology, geology, geography and in this order. This is followed by various works on times and seasons, including what may be called a history of the world in six "ages."

736-804. *System of Alcuin.*

ALCUINUS. De grammatica. Ed. Migne Patrol. lat. 101 (1863) 854. Flint, in: Presb. R 6 (1885) 416 (Men. same as Cassiodorus); Shields, Philosophia Ultima 2 (1889) 57.

Grammar, Rhetoric (dialectic), Arithmetic, Geometry, Music, Astrology.

ABOUT 844. *System of Hrabanus Maurus.*

HRBANUS MAURUS. De universo. Ed. Migne Patrol. lat. 111 (1864) 1-614.

HRABANUS MAURUS. De clericorum inst. Liber III., ed. Migne Patrol. lat. 107 (1864) 378-405.

(Science of Holy Scripture; Seven Liberal arts (form of Cassiodorus) Philosophy.)

Lyons, in: Enc. Brit. 8 (1878) 191-2.

God, Man, The animals [The heavens], The seasons, The waters, The earth, Public buildings, Philosophy, Language, Minerals, Weights and measures, Agriculture, War and naval arts, Sports, Fine arts and costume, Domestic economy.

1071-8. *System of Psellus.*

PSELLUS, Michael Constantine. Didascalia. In: Fabricius. Bibl. graeca 5 (1712) app. 2 pp. 69-186.

Lyons, in: Enc. Brit. 8 (1878) 192.

P's order may roughly be described as God; The mind and soul, The body, The virtues, The elements, Astronomy, Meteorology, The earth, The waters, Agriculture.

FL. 1120. *System of Hugo de S. Victore.*

HUGO DE S. VICTORE. Eruditionis didascalicae Ed. Migne Patrol. lat. 176 (1880) 739-838 especially 751.

Theoretical or speculative:
- Theology.
- Mathematics.
  - Arithmetic.
  - Music.
  - Geometry.
  - Astronomy.
- Physics.

Practical or Ethics.
Mechanical.
Logical.

Subdivisions are worth studying.

ABOUT 1200-1300. *Scholastic System.*

SHIELDS. Philosophia Ultima 2 (1889) 58 (outline.)

The system of Albertus Magnus (ab. 1200-1280) Duns Scotus (ab. 1265-1308) and Thomas Aquinas (ab. 1225-1274) is synthetized by Shields as: *Theology,* Ethics, Metaphysics, Mathematics, Physics; *Quadrivium,* Music, Astronomy, Arithmetic, Geometry; *Trivium,* Rhetoric, Dialectic, Grammar.

1221-1274. *System of St. Bonaventure.*

BONAVENTURA, S. Joh. De reductione artium ad theologiam, in: Opera, v. 6 (Romae 1596) 1-4.

Flint, in: Presb. R. 6 (1885) 416-7 (*Natural:* Physics, Mathematics, Metaphysics; *Rational:* Grammar, Logic, Rhetoric; *Moral:* Ethics, Economics, Politics.) Shields, Philos. Ult. 2 (1889) 57.

1240. *System of Vincent of Beauvais.*

VINCENTIUS BELLOVACENSIS. Speculum quadruplex. Argent 1473-6 and often.

Lyons, in: Enc. Brit. 8 (1878) 192 (outline); Flint, [redacted]resb.

R. 6 (1885) 417; Shields, Philosophia Ultima 2 (1889) 58 (mention.)
Naturale, Doctrinale, Historiale, Morale.

1260-1267. *System of Latini.*

Latini, Brunetto. Li livres du Tresor. Paris, 1863. 4°.
Lyons, in: Enc. Brit. 8 (1878) 192-3.

1266. *System of Roger Bacon.*

Bacon, Roger. Opus majus, ed. J. H. Bridges. Oxf., 1897. 8°.
Flint, in: Presb. 6 (1885) 417; Shields, Philosophia Ultima 2 (1889) 58 (mention.)
The order of the Opus Majus compared with the plan of the Scriptum principale seems to yield the following order: Philology, Mathematics, Physics (incl. Optics, Astronomy, Barology, Alchemy, Agriculture, Medicine, Experimental science), Ethics (incl. Relations to God, Civic morality, Personal morality, the Christian religion.)
Elsewhere B. gives an ingenious graphic representation of what is substantially Porphyry's ladder.

1297. *System of Dante.*

Dante, Alighieri. Il Convito 2.14-16. Opere minori, ed. Fraticelli. v. 3 (Fir., 1893) 151-67.
Flint, in: Presb. R. 6 (1885) 417 (detailed acc.); Shields, Philosophia Ultima 2 (1889) 57.

1360. *System of Glanville.*

Glanvilla, Bartholomeus de. De proprietatibus rerum. Printed [Lugd., 1480] and often.
Lyons, in: Enc. Brit. 8 (1878) 193 (outline.)

1362. *System of Berchorius.*

Berchorius, Petrus. Opera omnia. Mogunt., 1609. 3 v. f°, etc.
Lyons, in: Enc. Brit. 8 (1878) 193 ("plan of Glanville.")

1491. *System of Polizinano.*

Poliziano, Angelo. Panepistemon. Florent., 1491. 4°.
Flint, in: Presb. R. 6 (1885) 417-8 (detailed acc.); Shields, Philosophia Ultima 2 (1889) 58 (mention.)

1496. *System of Reisch.*

Reisch, Gregor. Margarita philosophica. Heidelberg, 1496, etc.
Lyons, in: Enc. Brit. 8 (1878) 193.

1501. *System of Valla.*

Valla, Georgius. (Placentinus) De expetendis et fugiendis rebus. Venetiis, 1501. 2 v. f°.
Lyons, in: Enc. Brit. 8 (1878) 193 (outline.)

1506. *System of Maffei.*

Maffei, Raphael. (Volaterranus) Commentarii Urbani. Roma, 1506. f°.
Lyons, in: Enc. Brit. 8 (1878) 193 (outline.)

1540. *System of Vanegas.*

Vanegas, Alexio. Primera parte de las differencias de libros que ay en el universo. . . . Valladolid, 1583. 8°.
Petzholdt (1866) 22 (full title and outline.)

1548. *System of Gesner.*

Gesner, Conrad. Pandectarum sive partitionum universalium libri xxi. Tiguri, 1548 [Bibl. Univ. II. i.-xix.] Partitiones Theol. 1549 [Bibl. Univ. III. xxi.]
Edwards 2 (1859) 762-3, Table I. no. I. (outline); Hottinger (1664) 82-4 (outline); Petzholdt (1866) 22 (full title and outline); Gar (1868) 258 (outline); Rouveyre 2 (1882) 11-13; Flint, in: Presb. R. 6 (1885) 435 (mention); Ottino (1892) 121; Maire (1896) 183 (title); Brown (1898) 40 (outline.)

1553. *System of Nizolio.*

Nizolio, Mario. De veris principiis et vera ratione philosophandi contra pseudophilosophos.

Flint, in: Presb. R. 6 (1885) 418 ("some originality" "extreme nominalist." Detailed acc.); Shields, Philosophia Ultima 2 (1889) 58 (mention.)

BEFORE 1560. *System of Taschkoeprisade.*

HAJI KHALFA. Lexicon bibliog. I. (1835) 31-41 (cf. previous pages for H. K.'s discussion of sub.); Petzholdt (1866) 21- (full title and outline.)

1587. *System of de Savigny.*

SAVIGNY, Christofle de. Tableau . . . de tous les arts. Paris, 1619. 37 p. f°.
Edwards 2 (1859) 764-5 (outline); Petzholdt (1866) 23 (full title and outline); Gar (1868) 258 (full title); Maire (1896) 183 (3 lines.)

1605. *System of Bacon.*

BACON, Francis. Partitio Universalis doctrinae humanae, De dign. et aug. Scientiarum, lib. 2, in: Works, ed. Montagu 8 (Lond., 1828) 87 sq.
Edwards 2 (1859) 765-7, Table 1 no. 2; Petzholdt (1866) 23 (full title and outline; also mentions 15 editions); Gar (1868) 258-9 (7 lines only); Flint, in: Presb. R. 6 (1885) 421-5; Bain, Logic (1886) 627-8; Shields, Philosophia Ultima 2 (1889) 61-3 (outline); Cave, Introduction (1896) 71-2; The Library 9 (1897) 203 (outline); Brown (1898) 29 (outline.)

Outline.

[I.] History (Memory):
Natural History.
Generations (Physics, Physical Geography, Species, etc.).
Praetergenerations (Monsters):
Arts.
Civil History:
Ecclesiastical.
Literary.
Civil history proper.
[II.] Poetry (Imagination):

Narrative.
Dramatic.
Parabolical.
[III.] Science of Philosophy (Reason):
Philosophy.
Divine Philosophy (Natural Theology.)
Natural Philosophy.
Speculative.
Physic.
Metaphysic.
Operative.
Mechanic.
Magic.
Human Philosophy (Anthropology.)
Philosophy of Humanity.
Human physiology (or Physical anthropology.)
Human psychology.
Logic.
Ethics.
Civil philosophy (modern Sociology.)
Society (Social relations.)
Commerce (Economics.)
Government (Politics.)
Theology (Revealed religion.)

1615. *System of Zara.*

ZARA, Antonio. Anatomia ingeniorum et scientiarum. Venetiis, 1615. 4°.
Lyons, in: Enc. Brit. 8 (1878) 193 (outline.)

1620. *System of Alsted.*

ALSTED, Johann Heinrich. Encyclopædia septem tomis distincta. Herbon. Nassov., 1630. 7 v. f°.
Lyons, in: Enc. Brit. 8 (1878) 193-4 (outline): Flint, in: Presb. R. 6 (1885) 425-6 ("rigidly methodical" detailed acc.)

1638. *System of Campanella.*

CAMPANELLA, Thomas. Philos, rationalis . . . grammatica, dialectica, rhetorica, poetica, historiographia, etc. Par., 1638. 4°.

also, De reformat sci. Ven., 1633. 4°, etc., etc. Flint, in: Presb. R. 6 (1885) 418-20; Shields, Philosophia Ultima 2 (1889) 58.

1644. *System of Descartes.*

DESCARTES, Renè. Les principes de la philosophie. Oeuvres, ed. Cousin. v. 3. Paris, 1824. 8°.
Flint, in: Presb. R. 6 (1885) 420-21 ("nearly same as that . . . by Sylvain Regis, Clauberg, Geulinx—viz. . . . Logic, Metaphysics, Physics, Ethics"); Shields, Philosophia Ultima 2 (1889) 71.

1649. *System of Fichet.*

FICHET, Alexander. Arcana studiorum omnium methodus. Lipsiae, 1710. f°.
Petzholdt (1866) 25-6 (full title and outline); Gar (1868) 259.

1650. *System of Hobbes.*

HOBBES, Thomas. Leviathan. Lond., 1651. f°. Molesworth 3 (1839) 71-3. "Of the several subjects of knowledge" [table.]
Flint, in Presb. R. 6 (1885) 428-30 ("deeper and truer insight . . . than Bacon." Detailed outline); Shields, Philosophia Ultima 2 (1889) 68.

1657. *System of Comenius.*

COMENIUS, Joh. Am. Opera didactica omnia. Amst., 1657. 4 v.
Laurie, S. S. John Amos Comenius. Lond., 1881. 8°. 2 ed., 1884.
Flint, in: Pres. R. 6 (1885) 426-7 (outline); Shields, Philosophia Ultima 2 (1889) 60 (mention, "religious.")

1678. *System of Anonymous—Flint.*

Flint, in: Presb. R. 6 (1885) 430 (outline.)

1688. *System of Locke.*

LOCKE, John. Essay concerning human understanding. Lond., 1741.

8°. Bk. 4, Ch. 21. "Of the division of the sciences;" ed. Fraser 2 (Oxf., 1894) 460-3.
Petzholdt (1866) 28 (full title and outline); Gar (1868) 260; Flint, in: Presb. R. 6 (1885) 430-1 ["inferior to Bacon and Hobbes"]; Brown (1898) 30 (outline.)

BEFORE 1699. *System of Weizel.*

WEIZEL, Erhard. Idea totius encyclopædiae, etc.
Flint, in: Presb. R. 6 (1885) 427-8.

1725. *System of Vico.*

VICO, Giambattista. Oeuvres. Paris, 1835. I. p. 222, II. p. 22-3.
Flint, in: Presb. R. 6 (1885) 432-3.

1726. *System of Wolff.*

WOLFF, Christian. [Commentatio de Deo, etc., 1726?. Cosmologia generalis, 1731 ?, etc.]
Flint, in: Presb. R. 6 (1885) 433-4 (detailed acc.); Shields, Philosophia Ultima 2 (1889) 63.

1728. *System of Chambers.*

CHAMBERS, E. Cyclopædia. Dub., 1740. f°. v. 1, p. 3-8.
Clarke, 2 (1806) 206-7 (with folding sheet); Petzholdt (1866) 31 (full title and outline); Gar (1868) 262 (men.)

1748. *System of Girard.*

[GIRARD, Gabr. Abbè.] Diderot. Encyclopédie. v. 2 (Par., 1751) f°, 161-5. (Given from ms. full outline.)
Peignot 2 (1802) 233-4; Achard 2 (1806-7) 282-6; Edwards 2 (1859) 778-9, Table 1, no. 4; Petzholdt (1866) 34 (full title and outline.)

1750. *System of Sulzer.*

SULZER, Johann George. Kurzer Begriff aller Wissenschaften 2 aufl. Frf. or Lpz., 1759. 8°.
Flint, in: Presb. 6 (1885) 435 (mention.)

1751. *System of d'Alembert.*

D'ALEMBERT. Ouvres 1 (Par., 1821) 99-109. also in Oeuvr. philos. 1805; also in Diderot and D'Alembert 1 (Paris 1751) 47-53 and folding table.
Edwards 2 (1859) 76-8, Table 1, no. 2 ("Modification of Bacon," outline given both in text and table); Petzholdt (1866) 42 (full title and outline); Gar (1868) 263; Flint, in: Presb. R. 6 (1885) 425 note; Bain, Logic (N. Y., 1886) 628; Shields, Philosophia Ultima 2 (1889) 61-2; Brown (1898) 29 (outline.)

1760. *System of De Montlinot.*

MONTLINOT, Leclerc de. In: Journal Encyclopédique, Sept., 1760.
Edwards 2 (1859) 784-5 ("fantastically symmetrical.")

1767. *System of Bielefield.*

BIELEFIELD, Jak. Fr. Erste Grundlinien d. allgem. Gelehrsamheit. Breslau, 1767. 3 v. 8°.

1775. *System of Büsch.*

BÜSCH, I. G. Encyklopädie der histor. philos. u. math. wissenchaften. Hamb., 1775. 8°.
Flint, in: Presb. R. 6 (1885) 435 (mention.)

1175 (187?). *System of Reimarus.*

REIMARUS, Herm. Sam.(?) Encyclopädie.
Flint, in: Presb. R. 6 (1885) 435 (mention.)

1778. *System of Schmid.*

SCHMID, Christian Heinrich. Abriss der gelehrsamkeit für encyclopädische vorlesungen. Ber., 1783. 8°. also in Gothaischen magazin, 1778. 8°.
Petzholdt (1866) 35 (full title and outline); Gar (1868) 264.

1781. *System of Kant.*

KANT, Immanuel. Critik der reinen Vernunft. Riga, 1781, 8°; ed.

Hartenstein. v. 3. Lpz., 8°; tr. Max Müller. Lond., 1881, 8°.
Flint, in: Presb. R. 7 (1886) 483-5 (outline and crit.); Shields, Philosophia Ultima 2 (1889) 63-4.

1782. *System of Klügel.*

KLÜGEL, Georg Simon. Encykl. Uebersicht d. kenntnisse u. Wissenschaften. Neubrandenb., 1790, 8°; cf. also his Encyklopädie. Berl., 1782-4, 8°; 2 ed. 1792-1816.
Flint, in: Presb. R. 7 (1886) 485 (mention.)

1783. *System of Meinecke.*

MEINECKE, J. H. Friedrich. Synopsis eruditionis universae. Quedlinburgi, 1788. 8°; also 1783-5.
Petzholdt (1866) 35 (full title and outline); Gar (1868) 264 (men.); Flint, in: Presb. R. 6 (1885) 435 (mention.)

1790. *System of Buhle.*

BUHLE, Johann Gottlieb. Grundzüge einer allgemeinen encyklopädie. Lemgo, 1790, 8°. Petzholdt (1866) 35-6 (full title and outline); Gar (1868) 264 (men.); Flint, in: Presb. R. 6 (1885) 435 (mention.)

1790. *System of Roth.*

ROTH, [Jh. Frd.?] System menschlicher (?) Kentnisse (??).
Flint, in: Presb. R. 7 (1886) 485 (mention.)

1792. *System of Eschenburg.*

ESCHENBURG, Johann Joachim. Lehrbuch der wissenschaftskunde; ed. 3 enl. Berlin, 1809; also 1792 and 1800.
Petzholdt (1866) 36 (full title and outline); Gar (1868) 264 (men.)

1794. *System of von Berg.*

BERG, von. Versuch über d. zusammenhaug aller theile der gelehrsamkeit. Frankf., 1794, 8°.
Flint, in: Presb. R. 7 (1886) 485 (mention.)

1796. *System of Krug.*

KRUG, Wilhelm Trangott. Versuch einer systematischen enzyklopädie der wissenschaften. Lpz. and Jena, 1796-7.
Petzholdt (1866) 37 (full title and outline); Gar (1868) 264

(men.); Flint, in: Presb. R. 7 (1886) 485 (outline); Shields, Philosophia Ultima 2 (1889) 61 (mention, "political.")

1798. *System of Regnault-Warin and others.*

Regnault-Warin, J. B. J. I. P. and others. Tableau d l'entendement humain . . . Introduction aux ètudes encyclopèdiques. Paris, 1798, 8°.
Edwards 2 (1859) 768,, Table 1, no. II. 3 (modification of Bacon.)

1799. *System of Meusel.*

Meusel, Johann Georg. Leitfaden zur geschichte der gelehrsamkeit I. (Lpz., 1799) 196-216.
Constantine 2 (1842) 195; Petzholdt (1866) 39 (full title and outline); Gar (1868) 264 (men.)

1802. *System of Thiebaut.*

Thiebaut, Arsenne. Exposition du tableau philosophique des connaissances humaines. Par., 1802, 8°.
Peignot 2 (1802) 248-56 (very detailed); Clarke 2 (1806) 198-206 (detailed); Petzholdt (1866) 41 (full title and outline); Gar (1868) 265.

1802. *System of Butenschoen.*

Peignot 2 (1802) 212-18; Achard, (1806-7) 246-52; Edwards 2 (1859) Table 1, no. 5; Petzholdt (1866) 40 (outline); Gar (1868) 264 (men.)

1803. *System of Schelling.*

Schelling, Friedrich Wilh. Jos. v. Vorlesungen ü. d. methode d. acad. studium. Tüb., 1803, 8°; also 1813; 1830, etc.
Flint, in: Presb. R. 7 (1886) 485-6 ("in no sense a classification of the sciences.")
System der gesammten Philosophie, 1804; first pub. in: Werke, Stuttgart 6 (1860) 131-6.
This is a full detailed tabular statement much more to the point than that quoted by Flint and in every sense a classification of the sciences.

1804. *System of Oken.*

OKEN, Lorenz. Uebersicht d. grundrisses d. systems der naturphil osophie. Frkf. a. M., 1804, 8°; also various other similar works. Flint, in: Presb. R. 7 (1886) 486 (mention, "so original as to be altogether unintelligible.")

1806. *System of Hefter.*

HEFTER, Karl Chr. Philosoph. darstellung aller wissenschaften. Lpz., 1806, 8°.
Flint, in: Presb. R. 7 (1886) 486 (mention.)

1806. *System of Topfer.*

TOPFER, Henr. Aug. Encyklop. generalkarte aller wissenschaften. Grimma, 1806, f°.
Flint, in: Presb. R. 7 (1886) 486 (mention.)

1807. *System of Ortloff.*

ORTLOFF, Jh. Andr. "Systematic distribution of the sciences" per haps his: Ueb. geschichte d. wissenschaften u. künste. Coburg, 1807, 8°.
Flint, in: Presb. R. 7 (1886) 486 (mention.)

1809. *System of Burdach.*

BURDACH, Karl Fr. Der organismus menschl. wissenschaft u. kunst. Lpz., 1809, 8°.
Flint, in: Presb. R. 7 (1886) 486 (mention.)

1809. *System of Kraus.*

KRAUS, Christian Jacob. Encyklopädische ansichten einiger zweige der gelehrsamkeit. . . . Königsberg, 1809, 8°.
Petzholdt (1866) 43-4 (full title and outline.)

1810. *System of Schmid.*

SCHMID, Carl Christian Erhard. Allgemeine encyklopädie und

methodologie der wissenschaften. Jena, 1810, 4°.
Petzholdt (1866) 44 (full title and outline); Gar (1868) 268.

1810. *System of Simon.*

SIMON, [Joh.?.Fried.?] Tabular survey of the sciences (cf. Flint.)
Flint, in: Presb. R. 7 (1886) 486 (mention.)

1815. *System of Destutt de Tracy.*

TRACY, Destutt de, A. L. C. Cours d'Idéologie. Paris, 1801-15, 5 v.
Flint, in: Presb. R. 7 (1886) 490; Shields, Philosophia Ultima 2 (1889) 63.

1815. *System of Stewart.*

STEWART, Dugald. Encyclopædia Britannica. Supplement. Preface to the first dissertation, v. 1 (1815) 1-17.
Shields, Philosophia Ultima 2 (1889) 62-3.

1816. *System of Bentham.*

BENTHAM, Jeremy. Chrestomathia. London, 1816-17, 2 pt., 8°, Works ed. Bowring 8 (Lond., 1843) 63-128.
Edwards 2 (1859) 791-2, Table 1, no. vii.; Petzholdt (1866) 46 (full title and outline); Gar (1868) 268; Flint, in: Presb. R. 7 (1866) 490-2 (outline "reminds . . . of . . . Hobbes . . . but less vigor . . . and more . . . pedantry"); Shields, Philosophia Ultima 2 (1889) 60 (mention, "Utilitarian.")

1816. *System of Jasche.*

JAESCHE, Gottlieb Benjamin. Einleitung zu einer architectonik u. systemat. Universal encyklopädie d. wissenschaften. Dorpat, 1816, 4°; Grundlinien, etc., 1818, 8°.
Flint, in: Presb. R. 7 (1886) 487 (mention.)

1816. *System of Hasse.*

HASSE, Fr. Chr. A. Encyklopädische tafeln. Lpz., 1816-20, 12°.
Petzholdt (1866) 46-7 (full title and outline); Gar (1868) 269.

1817. *System of Coleridge.*

COLERIDGE, Samuel Taylor. Encyclopædia metropolitana; or, Universal dictionary of knowledge . . . Lond., 1817-45, 4°; Introduction. (Lond., 1845, etc.,) p. x.; also p. 44.
Edwards 2 (1859) 792, Table 1, no. viii.; Petzholdt (1866) 47 (full title and outline); Gar (1868) 268; Flint, in: Presb. R. 7 (1886) 490-2 ("Coleridge . . . complained that under editorial revision his work was . . . 'so bedeviled that I am ashamed to own it' "); Bain, Logic (N. Y., 1886) 628-9; Shields, Philosophia Ultima 2 (1889) 64-5 (outline); Cave, Introduction (1896) 72; The Library 9 (1897) 204; Brown (1898) 31 (outline.)

Outline.

I. Div. Pure Sciences:
  [1.] Formal Sciences.
    Grammar.
    Logic, Rhetoric.
    Mathematics.
    Metaphysics.
  [2] Real Sciences:
    Morals.
    Law.
    Theology.
II. Div. Mixed and Applied Sciences:
  [1] Mixed.
    Mechanics.
    Hydrostatics.
    Pneumatics.
    Optics.
    Astronomy.
  [2.] Applied.
    I. Experimental Philosophy.
    II. Fine Arts.
    III. Useful Arts.
    IV. Natural History.
    V. Application of Natural History.
III. Div. Biographical and Historical.
IV. Div. Miscellaneous and Lexicographical.

1817. *System of Hegel.*

HEGEL, Geo. W. F. Encyklopädie d. philos. wissenschaften. Ed.

Henning 6 (Berl., 1843) 27-8 et passim.
Flint, in: Presb. R. 7 (1886) 487-90 ("whatever be the faults . . . for the first time . . . something like what a science of the sciences ought to be"); Shields, Philosophia Ultima 2 (1889) 66-7.

1817. *System of Janelli.*

JANELLI, Cataldo. Cenni sulla natura e necessità della scienza delle cose e della storie umane, 1817.
Flint, in: Presb. R. 7 (1886) 493 (outline, "no intrinsic merit.")

1819. *System of Grüber.*

GRÜBER, J. G. Ueber encyclopädisches studium. In: Ersch u. Gruber; Encyclop. 1, 2 (Lpz., 1819) lii. p.
Petzholdt (1866) 48 (full title and outline); Gar (1868) 269; Boccardo. Nuova enc. ital. 20 (1886) 262-4 (very full outline.)

1819. *System of Rüdiger.*

RÜDIGER, C. A. Uebersicht der wissenschaftlichen erkenntniss. Freyberg, 1819.
Petzholdt (1886) 48-9 (full title and outline); Gar (1868) 269.

System of Schopenhauer.

SCHOPENHAUER, Arthur. Die welt als wille und vorstellung. Lpz., 1819, 8°; 2 ed., 1844, 8°.
Flint, in: Presb. R. 7 (1886) 509-10 (detailed outline, "deserves to be noted only as an ingenious curiosity"); Shields, Philosophia Ultima 2 (1889) 64.

1820. *System of Longo.*

LONGO, Agatino [various works mentioned in appendix of Di Giovanni's Storia della Filosofia in Sicilia acc. to Flint.]
Flint, in: Presb. R. 7 (1886) 493 (mention.)

1822. *System of Comte.*

COMTE, Auguste. Systéme de philosophie positive 1 (1830) 57-115; also Positive polity, Eng. tr. 1 (1854) 355-68; iv. 161-8, 549, 597, etc.

Bain, Logic (N. Y., 1886) 629-30; Flint, in: Presb. R. 7 (1886) 496-501 ("He claimed but had no right whatever to claim that he originated the classification which he adopted. If that classification possess any merits they must be ascribed to Dr. Burdin, who conceived it, and to Saint Simon, who first received and published it.")
Shields, Philosophia Ultima 2 (1889) 72-6 (outline and excellent résumé of criticisms by Whewell, Huxley, Spencer, Fiske, Lewes, Bain, Littré, Mill); Cave, Introduction (1896) 72-5.

Form of 1830.

Mathematics.
Astronomy.
Physics.
Chemistry.
Physiology.
Social Physics.

Form of 1851.

Natural Philosophy.
Cosmology.
Mathematics.
Astronomy.
Physics.
Chemistry.
Biology.
Social Philosophy.

This much abused system to which its enemies grudg eany pretention to originality or merit has nevertheless been almost the chief stimulus to progress in classification during this century.

1827. *System of Arnott.*

ARNOTT, Neil. Elements of Physics. Lond., 1827.
Bain, Logic (N. Y., 1886) 629.
Flint, in: Presb. R. 7 (1886) 495-6 ("all phenomena physical, chemical, vital, mental"); Shields, Philosophia Ultima 2 (1889) 69.

1828. *System of Ferrarese.*

FERRARESE, Luigi. Saggio di una nuova classificazione della scienze.
Flint, in: Presb. R. 7 (1886) 493-4; Shields, Philosophia Ultima

2 (1889) 60-61 (mention, "ethical.")

1828. *System of Ventura.*

VENTURA, Giovachino. De methodo philosophandi. Rome.
Flint, in: Presb. R. 7 (1886) 493; Shields, Philosophia Ultima 2 (1889) 61 (mention, "ecclesiastical.")

1829. *System of Pamphilis.*

PAMPHILIS, Giacinto de. Geneografia dello scibile. 2 ed. 1869.
cf. Longo. Osservazione sulla G. del sig. Pamphilis, in: Giorn. di sci. per la Sic. v. 35.
Flint, in: Presb. R. 7 (1886) 494-5; Shields, Philosophia Ultima 2 (1889) 61 (mention, "aesthetical.")

1830. *System of Rosmini.*

ROSMINI, Antonio. Sull' origine delle idee tr. Lond., v. 3 (1884) 351-65. On the first division of the sciences [Pure (or formal) Logic, Applied.]
Flint, in: Presb. R. 7 (1886) 504-6; Shields, Philosophia Ultima 2 (1889) (outline); Davidson, Thomas, Philos. syst. of R. (Lond., 1882) introd. p. civ. [gives tabular outline.]

1834. *System of Ampère.*

AMPÈRE, André Marie. Essai sur la philosophie des sciences, 1834-43, 8°.
Lubbock (1838) app. p. ix.; Edwards 2 (1859) 797-8, Table 1, no. ix.; Petzholdt (1866) 51 (full title and outline); Gar (1868) 271; Flint, in: Presb. R. 7 (1886) 501-4; Shields, Philosophia Ultima 2 (1889) 71-2 (outline.)

1836-7. *System of Hamilton.*

HAMILTON, Sir William. Lectures on metaphysics, 1 vii. 1 (Edin., 1875) 111-120.
Flint, in: Presb. R. 7 (1886) 516-8; Shields, Philosophia Ultima 2 (1889) 69.

1838. *System of Lubbock.*

LUBBOCK, J. W. Remarks on the classification of the different branches of human knowledge. Lond., 1838, 8°.
Petzholdt (1866) 54 (full title and outline); Gar (1868) 272; Flint, in: Presb. R. 7 (1886) 509 ("hardly any value," outline.)

1839. *System of Löwe.*

LÖWE, Maximilian Leopold. Grundriss der allgemeinen hodegetik. . . . Dresden, 1839, 8°.
Petzholdt (1866) 54 (full title and outline); Gar (1868) 272.

1840. *System of Whewell.*

WHEWELL, William. Philosophy of the inductive sciences. Lond., 1840, 2 v., 8°; 3d ed. greatly altered, 1858, 2 v., 8°; Novum organon renovatum, B 2, ch. 9.
Flint, in: Presb. R. 7 (1886) 506-9 (detailed outline); Shields, Philosophia Ultima 2 (1889) 65-6 (outline.)

1840. *System of Gioberti.*

GIOBERTI, Vincenzo. Introduzione allo studio della filosofia. Brusselle, 1840, 8°, v. 3, c. 5.
Flint, in: Presb. R. 7 (1886) 506; Shields, Philosophia Ultima 2 (1889) 67.

1842. *System of Kirchner.*

KIRCHNER, C. Hodegetik; oder, Wegweiser zur universität für studierende . . . Lpz., 1852, 8°.
Petzholdt (1866) 56-7 (full title and outline); Gar (1868) 273.

1843. *System of Duval-Jouve.*

DUVAL-JOUVE, J. Traité de logique, on Essai sur la théorie de la science. Par. 1843, 8°, pp. 374-93.
Flint, Philos. . . and hist. of class. (1904) 193.

1843. *System of Proudhon.*

PROUDHON, Pierre Joseph. De la création de l'ordre dans l'humanité. Ed. 2. Paris, 1849, 12°.
Flint, in: Presb. R. 7 (1886) 504.

1844. *System of Arnold.*

ARNOLD, August. Wissenschaftskunde; oder, Encyclopädie und methodologie der wissenschaften. Königsberg, i. d. N. 1844, 8°.
Petzholdt (1866) 57 (full title and outline); Gar (1868) 273.

1844. *System of Voigt.*

VOIGT, Bernh. Fr. Wissenschafts-uebersicht. Weimar, 1844, 4°.
Petzholdt (1866) 57 (full title and outline.)

1846. *System of Lindsay.*

LINDSAY, A. W. C. Progression by antagonism. Lond., 1846, 8°.
Edwards 2 (1859) 804-5, Table 1, no. x.; Petzholdt (1866) 57-8 (full title and outline); Gar (1868) 273-4 (outline); Flint, in: Presb. R. 7 (1886) 509; Shields, Philosophia Ultima 2 (1889) 63 (mention); Brown (1898) 31 (outline.)

1847. *System of Albert.*

ALBERT, M. J. F. M. Recherches sur les principes fondamentaux de la Classification Bibliographique. Paris, 1847, 8°.
Edwards 2 (1859) 798-800, Table 1, n°. xii.; Petzholdt (1866) 57-8 (full title and outline); Gar (1868) 274 (outline.)

1847. *System of Richter.*

RICHTER, Franz J. Wissenschaftskunde. Wien, 1847, 12°.
Petzholdt (1866) 59 (full title and outline); Gar (1868) 274 (outline.)

1847. *System of Ramsay.*

RAMSAY, Sir George. A classification of the sciences in six tables. Lond., 1847, 4°.
Flint, in: Presb. R. 7 (1886) 509 ("altogether of an external and unphilosophical kind.")

1850. *System of Dove.*

DOVE, Patrick Edward. Theory of human progression. Lond., 1850, 8°.
Flint, in: Presb. R. 7 (1886) 510-14 ("an order of ever increasing complexity"); Shields, Philosophia Ultima 2 (1889) 69.

1851. *System of Cournot.*

COURNOT, Ant. Augustin. Essai sur les fondements de nos connaissances. Paris, 1851, 8°, v. 2, ch. 20-22.
Flint, in: Presb. R. 7 (1886) 514-15; Shields, Philosophia Ultima 2 (1889) 72.

1856. *System of Wilson.*

WILSON, Dr. W. D. Treatise on Logic. 1856, 341-46.
Edwards 2 (1859) 808-10, Table 1, no. xiii.; Petzholdt (1866) 62 (full title and outline); Gar (1868) 278; Flint, in: Presb. R. 7 (1886) 515-6 (outline); Shields, Philosophia Ultima 2 (1889) 61 (mention, "aesthetical"); Brown (1898) 31 (outline.)

1856. *System of Helfferich.*

HELFFERICH, Adolf. Organismus der wissenschaft. Lpz., 1856, 8°.
Flint, in: Presb. R. 7 (1886) 516 (mention, "hazy and confused.")

1858. *System of Hill.*

HILL, Pres't Thomas. Liberal education. Camb., Mass., 1858.
Shields, Philosophia Ultima 2 (1889) 61 (mention, "pedagogical.")

1859. *System of Renouvier.*

RENOUVIER, Charles. Traité de psychologie rationelle; ch. 18, in his: Essais de critique générale (Paris, 1854-64, 8°.)
Flint, in: Presb. R. 7 (1886) 518-20; Shields, Philosophia Ultima 2 (1889) 78.

1859. *System of Schmitz.*

SCHMITZ, Bernh. Encyclopädie des philologischen studiums der neueren sprachen. Greifswald, 1859, 8°.
Petzholdt (1866) 64 (full title and outline); Gar (1868) 279.

1861. *System of Predari.*

PREDARI, Francesco. Enciclopedia nazionale . . . 1 (Milano, 1861) 1-96.
Petzholdt (1866) 64 (full title and outline); Gar (1868) 279.

1863. *System of Di Giovanni.*

Di Giovanni, Vinc. Principii di filosofia prima. v. 1, lez. 3.
Flint, in: Presb. R. 7 (1886) 520 (outline); Shields, Philosophia Ultima 2 (1889) 67 (mention.)

1863. *System of Peccenini.*

Peccenini, Melchiore. Nuovo albero enciclopedico. Napoli, 1863.
Flint, in: Presb. R. 7 (1886) 520; Shields, Philosophia Ultima 2 (1889) 63.

1864. *System of Spencer.*

Spencer, Herbert. The classification of the sciences. Lond., 1864, 8°.
Compare also the ed. in essays 2 (N. Y., 1899) 74-117, esp. p. 78 and the folding tables.
Bain, Logic (N. Y., 1886) 630-9.
Flint, in: Presb. R. 7 (1886) 521-6; Shields, Philosophia Ultima 2 (1889) 76 (outline); Cave, Introduction (1896) 75-6 (Fiske's form); Pearson, Grammar of science, 1900) 510-13.

Outline.

Abstract Science.
Logic and
Mathematics.
Abstract-Concrete Science.
Mechanics,
Physics.
Concrete Science.
Astronomy,
Geology, Biology,
Psychology,
Sociology, etc.

Whatever may be the judgment as to its finality, this system is probably the most important modern system both as regards its nature and influence. It was first published as a sort of polemic against the system of Comte. In the above table the three divisions are not exactly correlative, but the abstract-concrete and concrete form a group over against the abstract. The sub-classes, too, are by no means correlative as they appear in this. It is impossible to give

anything like a complete view of the system without reproducing the elaborate folding tables.

1868. *System of Zeller.*

ZELLER, Ed. Ueber die aufgabe der Philosophie und ihre stellung zu den übrigen wissenschaften. Heidelb., 1868. Also in: Vorträge 2 Samml., 1877.
Flint, in: Presb. R. 7 (1886) 526 ("touches on . . . but does not directly treat.")

1869. *System of Harms.*

HARMS, F. Philosophische einleitung, in: Karsten, Gustav. Allgemeine Encyklopaedie der Physik. v. 1, Lpz., 1869, 8°. (only physical sciences.)
Flint, in: Presb. R. 7 (1886) 526-7.

1870. *System of Bain.*

BAIN, Alexander. Logic, deductive and inductive. N. Y., Appleton, 1886, 12°, pp. 25-30.
Flint, in: Presb. R. 7 (1886) 527 ("best part of it derived from Comte. Were it not for . . . practical sciences . . . would . . . be an improvement on Comte's and much superior to Spencer's.") Bain divides into abstract, concrete and practical.

1870. *System of Cantoni.*

CANTONI, Carlo. Corso elementare di Filosofia 1. Milano, 1870, 16°.
Flint, in: Presb. R. 7 (1886) 527-8; Shields, Philosophia Ultima 2 (1889) 69-70.

1870. *System of Valdarini.*

VALDARINI. Principio intendimento e storia della classificazione della umane conoscenze secondo Francesco Bacon. Firenze, 1870, 16°. 2d ed., 1880.
Flint, in: Presb. R. 7 (1886) 528 ("gives . . . acc. of classifications of science"); Shields, Philosophia Ultima 2 (1889) 63 (mention.)

1873. *System of Ribot.*

Ribot, Th. Heredity. N. Y., 1875, 12°, p. 193.
Mathematical, physical, biological, moral, and social sciences.

1874. *System of Peyretti.*

Peyretti, G. B. Instituzioni di filosofia teoretica I. Torino, 1874, 8°.
Flint, in: Presb. R. 7 (1886) 528 (outline, etc.); Shields, Philosophia Ultima 2 (1889) 67 (mention.)

1875. *System of Fiske.*

Fiske, John. Organization of the sciences. In his: "Outlines of Cosmic Philosophy," 1 (Bost., 1875) 188-233.
An extremely lucid presentation of the Spencerian system.

1875. *System of Labanca.*

Labanca, Baldassare. Dialettica. Firenze, 1874, 8°, v. 2, lib. 1v., c. 1.
Flint, in: Presb. R. 7 (1886) 528-9; Shields, Philosophia Ultima 2 (1889) 70.

1876. *System of Conti.*

Conti, Aug. Il vero nell' ordine. Firenze, 1876, 2 v., 8°.
Flint, in: Presb. R. 7 (1886) 529-30; Shields, Philosophia Ultima 2 (1889) 70 (mention.)

1877. *System of Erdmann.*

Erdmann, Benno. Gliederung der wissenschaften, in: Vierteljahrsschr. f. wiss. Philos. 2 (1877.)
Flint, in: Presb. R. 7 (1886) 530-31; Shields, Philosophia Ultima 2 (1889) 70.

1879. *System of Corleo.*

Corleo, Simone. Sistema della filosofia Universale. Roma, 1879, 8°.
Flint, in: Presb. R. 7 (1886) 531; Shields, Philosophia Ultima 2 (1889) 70 (mention.)

1881. *System of De Roberty.*

DeRoberty, M. E. La Sociologie. Par. 1881, 8°.
Mathematical sciences (axiomatic).
Astronomy (simple observation).
Physics and chemistry (observ. and experiment).
Descriptive sciences.
Mechanic.
Biology.
Psychology.
Sociology.
Flint, Philos...and hist. of class. (1904) 263-7.

1882. *System of Shields.*

Shields, Charles W. The order of the sciences. N. Y., 1882, 12°.
Also his Philosophia Ultima 2 (1889) 79-112.
Flint, in: Presb. R. 7 (1886) 532-4.

1882. *System of Bourdeau.*

Bourdeau, M. L. Théorie des sciences. Paris, 1882, 2 v., 8°.
Flint, in: Presb. R. 7 (1886) 531-2; Shields, Philosophia Ultima 2 (1889) 78.

1884. *System of Stanley.*

Stanley, H. M. On the classification of the sciences. In: Mind 9 (1884) 265-74.
Flint, in: Presb. R. 7 (1886) 534-5; Shields, Philosophia Ultima 2 (1889) 78-9.
Chemistry, Molecular Physics, Molar Physics, Biology, Psychology, Sociology, Theology.

1884. *System of Thompson.*

Thompson, Daniel Greenleaf. System of Psychology, v. 1. (Lond., 1884) 76-7.
Flint, in: Presb. R. 7 (1886) 535-6.

1886-7. *System of Masaryk.*

Masaryk, T. G. Versuch einer concreten logik. Wien. 1887, 8°.
(Bohemian original 1886).

Flint, Philos...and hist. of class. (1904) 272-83. (Outline in detail.)

1889. *System of Wundt.*

WUNDT, Wilhelm. Ueber die Einteilung der wissenschaften, in: Philos, studien 5 (1889) 1-55.

Outline.

[I.] Individual Sciences.
- A. Formal or Mathematical sciences.
- B. Material sciences.
  1. Natural sciences.
  2. Intellectual (spiritual?) sciences (incl. Psychology, Philology, Economics, History, etc.)

[II.] Philosophy.
1. Doctrine of knowledge.
2. Doctrine of fundamentals ("principien"?)

The above outline is only an abstract of what is carried out in detail in the essay. The admirable and suggestive essay is preceded by a critical account of the history of classification which is on the critical side (not the bibliographical, however) unequalled, at least in any of the sources consulted for this work.

1893. *System of de la Grasserie.*

LA GRASSERIE, Raoul de. De la classification objective et subjective des arts, de la littérature et des sciences. Par. 1893, 8°.
Flint, Philos...and hist. of class. (1904) 289-92.

1896. *System of Cave.*

CAVE, Alfred. Introduction to Theology. Edinb., Clark, 1896, 8°; pp. 79-80.

Outline.

I. Mathematics.
- (1) Arithmetic and Algebra.
- (2) Geometry.

II. Physics.
III. Chemistry.
IV. Astronomy.

(1) Sidereal.
(2) Planetary.
V. Biology.
VI. Geology.
VII. Pneumatology.
(1) Psychology.
(2) Logic.
(3) Ethics.
(4) Esthetics.
(5) Philology.
VIII. Sociology.
IX. Theology.

1896. *System of Stadler.*

STADLER, August. Zur klassification der wissenschaften, in: Archiv f. Syst. Philos. 2 (1896) 1-37, w. folding table.

Outline.

A. Knowledge.
(A) Doctrine of phenomena.
a. Natural science.
(a) Doctrine of bodies.
1. Cosmology.
2. Astronomy.
3. Science of the earth.
4. Mineralogy.
5. Biology.
(b) Psychology.
1. Subjective.
2. Objective.
3. Comparative.
b. Mathematics.
a. Geometry.
b. Arithmetic.
c. Kinetic.

(B) Doctrine of ideas.

a. Teleology.
(a) Pure teleology.

(b) Applied teleology.
1. Eudæmonistic pedagogy.
2. Doctrine of "Goods."
(1) Economics (material goods).
(2) Esthetics (spiritual goods).
b. Ethics.
(a) Pure ethics.
(b) Ethical pedagogy.
B. Theory of knowledge.
(A) Formal logic.
(B) Material logic.

Subdivisions given as applying to some or all classes under *Natural science* are as follows:

I. Morphology
II. Chemistry.
III. Histology.
IV. Physics.
V. History.

This is the most suggestive of recent systems—that of Wundt possibly excepted. The lettering of notation is not exactly that of Stadler, but is changed to avoid use of Greek and German letters.

1897. *System of Janet.*

JANET, Paul. Principes de métaphysique et de psychologie. Par. 1897, 2v. 8°. (Seventh lecture. Divides into sciences of nature and sciences of humanity.)
Flint, Philos...and hist. of class. (1904) 301-7.

1898. *System of Goblot.*

GOBLOT, Edmund. Essai sur la classification des sciences. Paris, Alcan, 1898, 296 p., 8°.
Polybiblon Pt. Litt., 1898, 399-402 (outline.)

1898. *System of Naville.*

NAVILLE, Adrien. Le principe général de la classification des sciences. In: Arch. f. syst. Philos. iv. (1898) 364-81.

NAVILLE, A. Nouvelle classification des sciences. Étude philosophique. (Bibl. de phil. cont. —2e éd. rev.) Paris, Alcan, 1901, pp. 178.
Class. acc. to the possible (Théorématique) the real (Histoire) and the good (Canonique.)

1898. *System of Hoffman.*

HOFFMAN, Frank S. The sphere of science. N. Y. 1898. 8° pp. 243-61 (ch. xii). The harmony of the sciences.

Empirical Sciences.
  Physical.
    Astronomy.
    Geology.
    Physics.
    Chemistry.
    Biology.
  Psychical.
    Psychology.
    Sociology.
    Descriptive theology.
Normative sciences.
  Philosophy.
    Logic.
    Mathematics.
    Aesthetics.
    Ethics.
    Economics.
    Politics.

1899. *System of Cogswell.*

COGSWELL, G. A. The classification of the sciences. Philos. Rev. 8 (1899) 494-512.

Conceptual.
  Philosophy.
  Mathematics.
Real.
  Inorganic.
  Organic.
  Psychical.

1899. *System of Meyer.*

MEYER, J. G. Das natürliche system der Wissenschaften. Strassb. 1899, 33 p. 8°.

1899. *System of Trivero.*

TRIVERO, Camillo. Classificazione della scienze. Milano 1899, 16+292 p. 16°.

Astronomy.
Geology.
Mineralogy.
Botany.
Zoology.
Psychology.
Sociology.
Flint, Philos... and Hist. of class. (1904) 320-4.

1900. *System of Pearson.*

Pearson, Karl. The grammar of science, 2 ed. Lond., 1900, 8°, pp. 514-527.

Outline.

A. Abstract Science.
Logic, orthology, methodology (qualitative.)
Arithmetic, algebra, calculus, etc., (quantitative.)
Geometry, trigonometry, etc., (Relations of space.)
Kinematics, etc., (Relations of time.)
B. Concrete Science.
Precise physical sciences.
Physics of the ether (light, heat, electricity, magnetism, etc.)
Atomic physics.
Molecular physics.
Molar physics.
C. Concrete Science. Organic Phenomena.
Geography and natural history (old sense). (Space.)
History (including evolution of species.)
Biology.
Morphology, etc., (Form and structure.)
Embryology, etc., (Growth, etc.)
Physiology.
Psychology.
Theory of instinct, etc.
Psychics.
Sociology.

1901. *System of These Lectures.*

Hylology:

Mathematics.
Physics.
Chemistry.
Astronomy.
Geology.
Biology:
Botany.
Zoology.
Physical anthropology (?)
Anthropology:
Psychology (Human).
Epistemology.
Aesthetics.
Useful arts.
Fine arts.
Language and literature.
Ethics (?)
Sociology (incl. "History").
Theology:
Cosmology.
Christology.
Ecclesiology.
Theology proper.

1903. *System of Whittaker.*

WHITTAKER, T. A compendious classification of the sciences. **Mind** NS 12 (1903) 21-34.
An adaptation of Comte.
Logic.
Mathematics.
Physics.
Chemistry.
Biology.
Animal psychology.
Sociology.
Human psychology.
Metaphysics.

1904. *System of Münsterberg.*

MÜNSTERBERG, Hugo. The classification of the sciences. Internation-

al Congress of Arts and Sciences. St. Louis 1 (1905) 99-127.

Outline.

A. Normative Sciences.
   1. Philosophical Sciences.
   2. Mathematical Sciences.

B. Historical Sciences.
   3. Political Sciences.
   4. Legal Sciences.
   5. Economic Sciences.
   6. Philological Sciences.
   7. Pedagogical Sciences.
   8. Aesthetic Sciences.
   9. Theological Sciences.

C. Physical Sciences.
   10. General Physical Sciences.
   11. Astronomical Sciences.
   12. Geological Sciences.
   13. Biological Sciences.
   14. Anthropological Sciences.

D. Mental Sciences.
   15. Psychological Sciences.
   16. Sociological Sciences.

E. Utilitarian Sciences.
   17. Medical Sciences.
   18. Practical Economic Sciences.
   19. Technological Sciences.

F. Regulative Sciences.
   20. Practical Political Sciences.
   21. Practical Social Sciences.

G. Cultural Sciences,
   23. Practical Educational Sciences.
   24. Practical Aesthetic Sciences.
   25. Practical Religious Sciences.

This system, invented for the St. Louis Congress, proved to have great merit when used as basis for actual organization of "knowledge" as this is understood today.

1904. *System of Rava.*

RAVA, Alfonso. La classificazione delle scienze e le discipline sociali. Roma, 1904, 172 p.
Rev. by Goblot. Rev. Philos. 58 (1904) 413-4.

1906. *System of Stumpf.*

STUMPF, C. Zur Einteilung der Wissenchaften. (Abh. d. k. P. Akad. d. Wiss., 1906) Berlin: Reimer, 1907, pp. 94.

1907. *System of Dantec.*

LE DANTEC, F. L'ordre des sciences. Rev. phil. 64 (1907 1-21, 248-71. 1. Psychology and logic, 2. Exact sciences, 3. Biology.

1909. *System of Froument.*

FROUMENT, P. Conception positive du monde: I, Faits généraux condensant le savoir humain; II, Coordination générale des connoissances humaines. Paris: Revue positiviste internationale, 1909, pp. 72.

1910. *System of Barthel.*

BARTHEL, E. Zur Systematik der wissenschaften. Arch. f. syst. Phil. 16 (1910) 498-520.

Outline.

A. Theory of knowledge.
B. Logic and Pure mathematics.
C. Natural science.
  I. Inorganic.
    1. Physics and Astronomy.
    2. Chemistry.
    3. Theory of matter.
  II. Organic.
    1. Morphology.
    2. Anatomy.
    3. Physiology.
    4. Biology.
    5. Geology.
    6. Theory of development.
    7. Psychology.
  III. History.
  IV. Humane sciences.
    1. Society.
      a. Sociology.
      b. Law.
      c. Religion.

2. The individual.
   a. Language.
   b. Literature.
   c. History of thought.

D. Philosophy.
   I. Empiric investigation.
   II. Metaphysics.
   III. Culture philosophy.

NOTE.—To keep the above list up to date compare especially the annual *Psychological Index* (N. Y. Stechert) under the heading "Methodology". This is one of the most thorough and effective bibliographical tools in existence. Besides this the new general works on Logic should be examined as most of them give some attention to the matter. Of the new titles inserted under Literature, Brown (Guide pp. 29-30), Flint and Taylor are of chief value for theoretical systems.

V. PRACTICAL SYSTEMS.

Systems of book classification are in general distinguished from theoretical systems not merely by their object but by the fact that they are provided with a notation. It is true that the purely theoretical systems are also often provided with what might be called a notation whose purpose is to indicate the logical subordination of classes. But notation in general, whether logical or artificial, is an important and essential characteristic of book classification, and for this reason is touched on from time to time in the following sketch, although without any attempt at exhausting a matter with which this work is not directly concerned.

There is a strong presumption that the practice of classifying books in libraries extends back nearly to the accepted date for the deluge. It is probable that the Egyptian and Hebrew (and for that matter the Vedic and Confucian as well) temple libraries were classified at a very early date, as the distribution of the Thoth literature and the arrangement of the books in the Hebrew canon seem to indicate, even if the present form of the latter as some contend is not older than 200 B. C.

That Assyrian and Babylonian libraries were classified is certain, and we know that in at least one instance the books of poetry were located together on the north side of the library, and in another instance we have a classed catalog, giving 25 tablets, of which 14

contained a knowledge of the earth and 11 of the heavens, subdivision 3 of this second class being Works on the planet Venus, 4 On the planets in general, 5 and 6 On the moon, and 8 On the comets (cf. North Brit. Rev. 51 (1870) 168).

There are many other similar suggestions of early classification and doubtless better examples than those given, but the proper history of book classification only begins with that of the Alexandrian library as expounded, if not invented, by Callimachus. There is a curious possibility that this system, too, may be traced to Aristotle, and that he may be found to be the father of book classification as well as of theoretical systems, for Strabo not only says that he was the first collector of books of whom we have knowledge, but that he taught the kings of Egypt ("suntaxin") "library economy"!—at least this seems much more literal and probable than Falconer's translation "suggested to the kings of Egypt the formation of a library"! (Strabo 13, 1:54.)

The historical tradition, however, begins with Callimachus.

B. C. 260-240. *System of Callimachus (Library of Alexandria, Egypt.)*

Catalogue of the Alexandria Library in 120 books (or classes?). The work is lost, but fragments and references from Athenaeus, Diogenes Laertius, Suidas, Dionysius Halicarnassus, and others are collected in: Wachsmuth, C. Die pinakographische thätigkeit des Kallimachos. Philologus 16 (1860) 653-66.

The outline of classification seems, so far as one can pick it out, to have been as follows:

Poets.
Lawmakers.
Philosophers.
Historians.
Rhetoricians (Orators.)
Miscellaneous writers.

We have also many hints of subdivisions such as Epic, Comic, Tragic, Dithyrambic, under poetry, also Birds, Fishes, Geometry, Medicine, Cheesecakes, Feasts, etc.

The subdivisions seem to have been, in some cases at least, chronological by periods, and in the short miscellaneous subjects at least probably alphabetical by authors, since Athenaeus mentioning four writers on the subject of Cheesecakes (Class 6) gives them in

alphabetical order. The description included author, title or first words of work and number of lines apparently also date and place. If it is true, as has been alleged, that Callimachus used the catchwords of a title or first word of work to indicate the place of the book, this was a true "Abbreviation notation."

812. *System of the Mediaeval Libraries.*

In the mediaeval period the monastic libraries generally (*e. g.,* Staffelsee 812, Reichenau 822, Friaul 837, Lorsch (10th cent., etc., etc.,) arranged their Bibles and commentaries first and then the works of the Fathers. Sometimes the service books come before and sometimes after, and secular books also formed a separate class.

831. *System of the Monastic Library of St. Requier.*

D'ACHERY, Spicilegium, iv., 115-188; Becker, Gustav. Catal. Bibl. ant. (Bonnae, 1885) 24-9; Edwards 2 (1859) Table 2, no. 1.
Subdivisions differ slightly from those given by Edwards, *e. g.,* Divinity includes nos. 1-195 and is divided into Bible and Commentaries, Fathers (alphabetically), Canonics, etc.

1347. *System of the Monastic Library of St. Emmeram at Ratisbon.*

SCHMELLER. Ueber Büchercataloge des xv. und früherer Jahrhunderte. In: Serapeum 2 (1841) 16-18.
Edwards 2 (1859) Table 2, no. ii.; Collan; Petzholdt (1866) 21 (full title and outline.)

1451. *System of the Aldersbach Monastic Library.*

SCHMELLER. In: Serapeum 2 (1841) 260; Becker, Catal. bibl. ant. (1885) 289; Gottlieb, p. 325.
Classified into Magna, Mediocria, and Manualia.

1498. *System of Manutius.*

MANUTIUS, Aldus. Libri Graeci impressi.
Edwards 2 (1859) 761, Table 2, no. iii. (gives 5 classes); Rouveyre 2 (1882) 10; Ottino (1892) 120 (outline); Maire (1896) 182 (outline); Brown (1898) 40 (outline.)

1504. *System of Syon Monastery.*

BATESON, Mary, ed. Catalogue of the library of Syon Monastery, Isleworth. Cambridge, 1898, 8°.

A, Grammar and classics; B, Medicine and astrology; C, Philosophy; D, Commentaries on the sentences; E, Bibles and Concordances; F-I, Commentaries; K, History; L, Dictionaries; M, Lives of saints; N, Fathers; O, Devotional tracts; P-S, Sermons; T, Canon law; V, Civil law. Not divided according to size, but subject only.

1546. *System of Estienne.*

STEPHANUS, Henricus. Index librorum qui officina ejusdem H. S. hactenus prodierunt. P ar., 1560, 8°.

Edwards 2 (1859) 762 (gives 14 classes), Table 2, no. iv.; Rouveyre 2 (1882) 11; Ottino (1892) 120-21 (outline) Maire (1896) 182.

1560. *System of Trefler.*

TREFLER, Florian. Methodus exhibens . . . quorumlibet librorum, ordinationem . . . Augustae, 1560, 8°.

Edwards 2 (1859) 763-4 (gives 17 classes); Petzholdt (1866) 22-3 (full title and outline); Gar (1868) 258 (full title.)

1583. *System of La Croix du Maine.*

LA CROIX DU MAINE. Bibliothèques françoises. Paris, 1684; also éd. de Juvigny. Paris, 1772-3, 6 v., 4°, II. v. 2, p. 25 sq.

Maire (1896) 183 (full title) 193-5 (outline, 107 classes.)

1597. *System of Maunsell.*

MAUNSELL, Andrew. Catal of English printed books. Lond., 1597.

Brown (1898) 41.

1631. *System of Araoz.*

ARAOZ, Francisco de. De bene disponenda Bibliotheca . . . Matriti, 1631, 8°.

Petzholdt (1866) 23-4 (full title and outline); Gar (1868) 259 (2 lines.)

1631. *System of Rhode (University of Padua.)*

HOFFMANN. (Ein) bibliothekswissenschaftliches Gutachten, abgegeben zu Padua im jahre 1631 . . . Hamburg, 1856, 4°; also in: Gratulationsschrift 1856, p. 47-64, and in: Serapeum 17 (1856) Intelligenzbl., no. 2-5, and in: Neuer Anz., p. 71.8.
Edwards 2 (1859) p. 769-71, Table 2, no. vi. (model of Naudé); Petzholdt (1866) 24 (full title and outline); Gar (1868) 259 (full title.)

1635. *System of Clemens.*

CLEMENS, Claudius. Musei sive Bibliothecae . . . instructio, etc., libri. iv. Lugduni, 1635, 4°.
Peignot 2 (1802) 220-80; Horne 2 (1814) 556; Edwards 2 (1859) 796, Table 2, no. vii.; Mira 2 (1862) 134-5; Petzholdt (1866) 25 (full title and outline); Maire (1896) 183;195-6 (outline); Clarke, in: Library 10 (1898) 327-9; 385-7 (outline).

1635. *System of Arias Montanus.*

ARIAS MONTANUS. Regiae Bibliothecae S. Lavrentii Escorialis descripto . . . Lugduni, 1635, 4°.
Peignot 2 (1802) 203-4; Achard 1 (1806-7) 216-8; Petzholdt (1866) 24 (full title and outline); Gar (1868) 259 (full title.)

1643. *System of Naudé.*

NAUDÉ, Gabriel. Bibliotheca Cordesianae catalogus . . . Parisiis, 1643, 4°.

NAUDÉ, Gabriel. Dissertatio de instruenda Bibliotheca (Schmidt, De Bibliothecis. Helmst., 1703, 4°, p. 122, 123.)

NAUDÉ, Gabriel.. Advis pour dresser une bibliothèque. Par., 1627, 8°.
Hottinger (1664) 80-1 (outline); Legipontius (1747) 42; Peignot 2 (1802) 246; Horne 2 (1814) 561-2; Constanin 2 ed. (1842) 158; Edwards 2 (1859) 771, Table 2, no. v.; Mira 2 (1862) 135; Petzholdt (1866) 25 (full title and outline); Gar (1868) 259; Maire (1896) 183; Clarke, in: Library 10 (1898) 387-90 (outline.)

1646. *System of Jacob.*

JACOB, R. P. Lud. Bibliographia Gallica universalis, 1646. Elen-

chus materiarum bibliographiae parisinae. Parisiis, 1647, 4°.
Horne 2 (1814) 558; Maire (1896) 183; 196-7. (outline.)

1658. *System of London.*

London, William. Catalogue of the most vendible books, etc. Lond., 1658.
Brown (1898) 42.

before 1664. *System of Mabunus.*

Mabunus, Johannes. Hottinger (1664) 80 (Three classes: Moralia, Theoretica, Ascetica); Legipontius (1747) 47.

before 1664. *System of Frisius.*

Frisius, Jacobus.
Hottinger (1664) 81-2 (outline.)

1664. *System of Hottinger.*

Hottinger, Johann Heinrich. Bibliothecarius quadripartitus. Tiguri, 1664, 4°, p. 84-88.
Petzholdt (1866) 26 (full title and outline); Gar (1868) 259 (2 lines.)

1669. *System of Fabri.*

Fabri, Honoratus. Euphyander. Lugd., 1669, 12°.
Legipontius (1747) 47 (outline.)

1669. *System of Lomeier.*

Lomeier, Johann. De bibliothecis liber singularis. . . . Helmstadii, 1705. 4°; also Zutphaniae, 1669, 8°; Amst., 1669; 8° ?; 2 ed. Ultraj., 1680, 8°.
Horne 2 (1814) 560; Petzholdt (1866) 26 (full title and outline); Gar (1868) 259.

1678. *System of Garnier.*

Garnier, Jean. Systema Bibliothecae Collegii Parisiensis Societats Jesu. Parisiis . . . 1678. . . Francofurti, 1728, 4°; also in:

Serapeum 11 (1850) Intelligenzbl. 105-10, 113, 121-26, 129-33, 137-40.
Horne 2 (1814) 557-8; Constantin (1842) 154; Edwards 2 (1859) 774-6, Table 2, no. viii.; (461 subdivisions. Main ones given here); Mira 2 (1862) 135-6; Petzholdt (1866) 26-7 (full title and outline); Gar (1868) 259; Maire (1896) 183; Brown (1898) 42 (outline.)

1679. *System of Bouilleaud.*

Bouilleaud. Bibliotheca Thuana. Paris, 1679, 8°; Hamburg, 1679, 8°; also in: Serapeum, Jahrg. 13 (1852); Intelligenzbl. 105-9, 113-17, 121-26, 129-33, 137-41, 145-49, 153-56.
Legipontius (1747) 49; Edwards 2 (1859) 773-4, etc., Table 2, no. ix. ("usual French system"); Petzholdt (1866) 27 (full title and outline); Gar (1868) 259-60; Maire (1896) 183.

1683. *System of Baillet.*

Baillet, Adrien. Jugemens des savans sur les principaux ouvrages des auteurs . . . Amst., 1725, 4°; first Par., 1685-6, 12°; 1722-30, 4°. Peignot 2 (1802) 204-7; Achard 1 (1806-7) 218-19; Petzholdt (1866) 27-8 (full title and outline); Gar (1868) 260.

1683. *System of Ott.*

Ott, Johann Heinrich. Neujahrsblatt hrsg. von der Stadtbibliothek in Zürich. [Zurich, 1845,] 4°, p. 79, "Series Repositorium . . . bibl. Tigurinorum a 1683"; also in Serapeum (1849) Intelligenzbl., p. 93-4.
Petzholdt (1866) 27 (full title and outline.)

1688. *System of Morhof.*

Morhof, Daniel Georg. Polyhistor. literarius, philosophicus et practicus. . . . Lubecae, 1747, 4°; also Lubec, 1688, 4°; 1695, 4°; 1708, 4°; 1714-1732.
Petzholdt (1866) 28-9 (full title and outline); Gar (1868) 260 (full title.)

1697. *System of Rostgaard.*

Rostgaard, Frédéric. Projet d'une nouvelle méthode pour dresser le

catalogue d'une bibliothèque . . . Francofurti, 1728, 4°.
Petzholdt (1866) 29 (full title and outline); Gar, (1868) 260.

1705. *System of Gabriel Martin.*

MARTIN, Gabr. Bibliotheca Bultelliana, etc., 8°. Paris, 1711, 12°; (also the catals. of Dufay, Hoym, de Rothelin and Bellanger.)
Diderot et D'Alembert. Encyclopédie, v. 2, (Paris, 1851) art. Catalogue p. 760-1 ("best and most generally adopted at date"; outline given.)
Peignot 2 (1802) 236-7; Achard 2 (1806-7) 107; Edwards 2 (1859) 781-2, Table 2, no. ix.7 ("Modification of Bouilleaud"); Petzholdt (1866) 29-30 (full title and outline); Gar (1868) 260-1; Rouveyre 2 (1882) 14-15.

1709. *System of Marchand.*

MARCHAND, Prosper. Catalogus librorum bibliothecae Ioachimi Faultrier. Paris, 1709, 8°.
Peignot 2 (1802) 235-6; Achard 2 (1806-7) 10-16; Edwards 2 (1859) 777, Table 1, no. iii.; Petzholdt (1866) 30 (full title and outline); Gar (1868) 261.

1709. *System of Fontanini.*

FONTANINI, Justus. Dispositio catalogi Bibliothecae Josephi Renati . . . Romae, 1709, 4°; also 1711, f°; p. 583-720; also Francofurti, 1728, p. 145-88.
Edwards 2 (1859) 777-8 (17 classes given, 1828 in all; alphabetical arr. in general); Petzholdt (1866) 30 (full title and outline); Gar (1868) 261.

1718. *System of Leibnitz.*

LEIBNITZ, G. W. Idea bibliothecae publicae secundum classes scientiarum ordinandae, in: Otium Hanoveranum, etc. Leipz., 1718, 8°, p. 128-38; also in Opera omnia. Genevae, 1768, 4°, v. 5, p. 209-14.
Horne 2 (1814) 559; Edwards 2 (1859) 776-7, Table 2, no. x. (10 main classes); Petzholdt (1866) 30-1 (full title and outline); Gar (1868) 261-2; Flint, in: Presb. R. 6 (1885) 431-2 (outline);

Shields, Philosophia Ultima 2 (1889) 60 (mention "academic.")

1723. *System of Middleton.*

Middleton, Conyers. Bibliothecae Cantabrigiensis ordinandae methodus qaedam . . . Cantabrigiae, 1723, 4°; also in: Misc. works, 1755, 8°; 1752-7, 4°, v. 3, p. 475-502; also in: Serapeum 11 (1850) Intelligenzbl. p. 81-83, 89-91.
Edwards 2 (1859) 779-81, Table 2, no. xi.; Petzholdt (1866) 31 (full title and outline); Gar (1868) 262.

1736. *System of Cocchi.*

Cocchi, Antonio. (Biblioteca Magliabechiana now part of the B. Nazionale at Florence.)
Fumagalli (1890) 93-4 (Forty classes by subjects, each divided again by size and books arranged alphabetically by author in each class outline.)

1742. *System of Frobesius.*

Frobesius, Jo. Nicolaus. Bibliotheca Meibomiana. Helmaestadi, 1742, 8°.
Petzholdt (1866) 31-2 (full title and outline); Gar (1868) 262 (full title.)

1746. *System of Formey.*

Formey, Samuel. Conseils pour former une bibliothèque peu nombreuse, mais choisie . . . Ber., 1756, 8°; (also 1746, 1750, 1754, 1764, 1775.)
Horne 2 (1814) 557; Petzholdt (1866) 32 (full title and outline); Gar (1868) 262.

1747. *System of Beccelli.*

Becelli, Julius Cæsar. De bibliotheca instituenda ac ordinanda liber. Veronae, 1747, 40.
Petzholdt (1866) 32 (full title and outline); Gar (1868) 262 (men.)

1747. *System of Legipontius.*

Legipontius, Oliver. Dissertationes philologico-bibliographicae

. . . Norimbergae, 1747 4°, p. 51-65; also in Spanish, 1759, 8°.
Horne (1814) 559-60; Petzholdt (1866) 32-3 (full title and outline); Gar (1868) 262 (full title.)

1747. *System of Crucemannus?.*

Legipontius (1747) 46-7 (outline.)

1747. *System of the Wolfenbuttel Library.*

Legipontius (1747) 47 (outline.)

1748. *System of Francke.*

FRANCKE, J. M. Catalogi Bibliothecae Bunavianae specimen. Lipsiae, 1748, 4°.
Petzholdt (1866) 33-4 (full title and outline); Gar (1868) 263.

1760. *System of Casiri.*

CASIRI, Michael. Bibliotheca Arabico-Hispana Escurialensis. Matriti, 1760-70, f°.
Peignot 2 (1802) 220; Petzholdt (1866) 34 (full title and outline); Mira 2 (1862) 136; Gar (1868) 263 (men.)

1763. *System of De Bure.*

DE BURE, Guillaume. Catalogue des livres de la Bibliothèque de feu . . . le Duc de la Vallière. Par., 1783, 8°, v. 1, p. xxxv-lx.
De Bure, Guillaume, Bibliographie Instructive. Par., 1763, 8°, p. xv-lxvi.
Peignot 2 (1802) 237-44; Clarke 2 (1806) 162-197; Achard 2 (1806-7) 107-161; Edwards 2 (1859) 781-2, Table 2, no. ix. (Modification of Bouilleaud); Mira 2 (1862) 150-59 (detailed); Petzholdt (1866) 34-5 (full title and outline); Gar (1868) 263.

1773. *System of Cels.*

CELS, Jacques Martin, and Lottin, A. M. Coup d'oeil eclairé d'une grand bibliothèque à l'usage de tout possesseur de livres, 1773.
Clarke, in: The Library 10 (1898) 390, 391, 394-5 (outline, adaptation of Bouilleaud's.)

1774. *System of Denis.*

DENIS, Mich. Einleitung in die büchkunde, 1777-8; Ed. 2. Wien, 1795-96, 4°.

Denis, Mich. Grundriss d. Bibliographie. Wien, 1774, 8°.

Peignot 2 (1802) 232-3; Achard 1 (1806-7) 281-2; Edwards 2 (1859) 789-90 (gives 7 main classes); Mira 2 (1862) 137-8; Petzholdt (1866) 35 (full title and outline); Gar (1868) 263-4.

1793. *System of Schütz-Hufeland and Ersch.*

[SCHÜTZ-HUFELAND & ERSCH. Allegemeines repertorium der literatur für die jahr 1785 bis 1790 (-1800?) Jena, 1793-94.

Ersch, Johann Samuel. Handbuch der deutschen literatur. Lpz., 1812-14, 2 v., 8°.

Peignot 2 (1802); Achard 2 (1806-7) 42-98; Constantin 2 ed. (1842) 195; Edwards 2 (1859) p. 789, Table 2, no. xii. (1200 classes, of which E. gives 16 principal, "translated at length in Achard"); Petzholdt (1866) 36-7 (full title and outline); Gar (1868) 264 (men.); Gräsel (1890) 152-3 (outline.)

This system is honored by Gräsel as "beyond a doubt one of the best," with first place and most attention, and he recommends it to the librarian as in many respects a model. Its notation is certainly not a model, for it seems liable to run to I. 2. B. b. *a.* aa. aa. bbb. *bbb.* bbbb-Art of war—the italics here representing the corresponding Greek letters.

1798. *System of Camus.*

CAMUS, A. G. Observations sur la distribution et le classement des livres d'une bibliothèque. Par., 1798. In: Memoires de l'Institut . . . Littérature. v. 1 (1798) 643-66, 675-6.

Peignot 2 (1802) 218-20; Achard 1 (1806-7) 252-80; Horne 2 (1814) 555-6; Edwards 2 (1859) 786; Mira 2 (1862) 139-40; Petzholdt (1866) 37-8 (full title and outline); Gar (1866) 264 (men.)

1799. *System of Ameilhon.*

AMEILHON. Projet sur quelques changemens . . . a nos catalogues de bibliothèques. In: Memoires de l'Institut National Littérature et Beaux Arts 2 (Paris, 1799, 4°,) 477-92.

Peignot 2 (1802) 202-3; Achard 1 (1806-7) 197-216; Horne 2 (1814) 554-5; Edwards 2 (1859) 785-6, Table 2, no. xiii.; Mira 2 (1862) 139; Petzholdt (1866) 38-9 (full title and outline); Gar (1868) 264 (men.)

1800. *System of Coste.*

Peignot 2 (1802) 230-2; Achard 1 (1806-7) 280-1; Petzholdt (1866) 39 (outline from Peignot); Gar (1868) 264 (men.)

1800. *System of Daunou.*

Daunou, P. Cl. Fr. Mémoire sur la classification des livres d'une grande bibliothèque . . . In: Bulletin du bibliophile 4 (1840-41) 402-10; also, abbreviated. Paris, 1841.
Constantin (1842) 188-90; Edwards 2 (1859) 787-8 (gives 33 classes in 8); Petzholdt (1866) 39 (full title and outline); Gar (1868) 264-5 (6 lines.)

1801. *System of Laire.*

Peignot 2 (1802) 234-5; Achard 2 (1806-7) 98-100; Edwards 2 (1859) 768-9; Petzholdt (1866) 39-40 (outline from Peignot); Gar (1868) 264 (men.)

1801. *System of Parent.*

Parent, ainé. Essai sur la bibliographie. Par., 1801, 8°.
Peignot 2 (1802) 246-7; Achard 2 (1806-7) 9-12; Horne 2 (1814) 561-2; Edwards 2 (1859) 788, Table 2, no. xiv.; Petzholdt (1866) 40 (full title and outline); Gar (1868) 265 (men.); Maire (1896) 197 (outline.)

1802. *System of Ferrario.*

Ferrario, Giulio. Progetto per un catalogo bibliografico. Milano, 1802, 8°.
Petzholdt (1866) 40-1 (full title and outline); Gar (1868) 265.

1802. *System of the Bibliotheque Nationale, Paris.*

Rapport de M. Leopold Delisle, administrateur general de la Biblio-

thèque nationale a M. le Ministre de l'Instruction public, 3 juin, 1885. (Bulletin des bibliothèques et des archives 4 (1885) 23 sq. Peignot 2 (1802) 208-13 (outline); Rouveyre 2 (1882) 63-66 (outline); Fumagalli (1890) 99-101 (outline); Maire (1896) 223 (outline.)

Thirty main classes indicated by letters, the extra ones being D^2, E^*, O^2, O^3, P^2, Vm, Y^2. Minute subdivisions. Order on shelves (1) Main classes; (2) Accession periods: period 1 arr. acc. to old catalogue.

1802. *System of Massol.*

Peignot 2 (1802) 244-6; Achard 2 (1806-7) 6-9; Petzholdt (1866) 40 outline from Peignot); Gar (1868) 264 (men.)

1802. *System of Peignot.*

PEIGNOT, G. Dictionnaire raisonné de bibliologie 2 (Paris, 1802) 256-80.

Clarke 2 (1806) 208-18; Achard 2 (1806-7) 12-42; Horne 2 (1814) 562-3; Edwards 2 (1859) 768-9; Mira 2 (1862) 140-5 (detailed); Petzholdt (1866) 41 (full title and outline); Gar (1868) 265.

1803. *System of Barbier.*

BARBIER, A. A. Quelques idèes sur les divisions du catalogue de la bibliothèque du Conseil d'etat. Paris, 1803, f°; also in: Bulletin du bibliophile 7 (1845) 119-21; also in: Leipziger allgemeinen press-zeitung 2 (1841) sp. 53-55, 201-7.
Achard 1 (1806-7) 219; Horne 2 (1814) 556; Constantin (1842) 161-80; Edwards 2 (1859) 796, Table 2, no. ix. (arrangement of Bouilleaud); Mira 2 (1862) 59-79 (detailed); Petzholdt (1866) 41-2 (full title and outline); Gar (1868) 265.

1806. *System of v. Demidoff.*

DEMIDOFF, Paul de. Catalogue systématique des livres . . . v. 1. Moscou, 1806, 4°.
Petzholdt (1866) 42 (full title and outline); Gar (1868) 265-6 (outline.)

1807. *System of Achard.*

ACHARD, C. F. Cours élémentaire de bibliographie 2 (1807) 161-243.
Mira 2 (1862) 145-50 (detailed.)
Edwards 2 (1859) 796, Table 2, no. ix. 2 (modification of Bouillaud); Petzholdt (1866) 42-3 (full title and outline); Gar (1868) 266 (outline.)

1808. *System of Olenin.*

OLENIN, E. A. Essai sur un nouvel ordre bibliographique pour la Bibliothèque Impériale de St. Petersburg . . . St. Petersburg, 1808, 4°. (Reprinted in the first Report on British Museum, 1835, App., 457.)
Edwards 2 (1859) 790, Table 2, no. xv.; Petzholdt (1866) 43 (full title and outline); Gar (1868) 266 (outline.)

1809. *System of Girault.*

GIRAULT, Cl. Xav. Systéme de bibliographie. . . . Dijon, 1809, 8°.
Achard 2 (1806-7) 73-85; Edwards 2 (1859) 790-1, Table 1, no. vi.; Petzholdt (1866) 43 (full title and outline); Gar (1868) 266 (outline.)

1810. *System of Brunet.*

BRUNET, Gustav. Manuel du libraire et de l'amateur de livres. Paris, 1860-1865, 6 v., 8°; v. 6, col. xxvii. 4 ed. 5 (Paris, 1844, 8°) 1-798; 1 ed., 1810.
Constantin (1842) 180-3; Edwards 2 (1859) 796, Table 2, no. ix. 1 (modification of Bouilleaud); Mira 2 (1862) 79-202 (detailed); Petzholdt (1866) 44 (full title and outline); Gar (1868) 266-7 (outline); Rouveyre (1882) 21-40 (very detailed); Ottino (1892) 123-238; Maire (1896) 186 (contains a long series of special criticisms by Prieur); Maire (1896) 198-208 (detailed outline); Brown (1898) 43 (outline); The Library 10 (1898) 162-3 (outline.)
Outline.
Theology.
Jurisprudence.
Sciences and arts.
Belles-lettres.

History (including literary history and bibliography.)

More than eleven hundred subdivisions are given in the table to the 5th edition (1864.) Founded as this system was on a very large number of actual titles, it has many elements of practicality. This practicality combined with its accessibility and the fact that the titles were actually classified have combined to make this the most used of all bibliographical systems, up to very recent times at least.

1812. *System of the Bibliographie de la France.*

BIBLIOGRAPHIE DE LA FRANCE. Tableau bibliographique des ouvrages en tous genres qui ont paru en France . . . Par., 1812, sq.
Constantin (1842) 183-5; Petzholdt (1866) 44-5 (full title and outline); Gar (1868) 267-8.

This is not the same as the system of the present periodical of this name whose outline is given by Maire.

1814. *System of Horne.*

HORNE, Thomas Hartwell. An introduction to the study of Bibliography. Lond., 1814, p. 373-402.
Petzholdt (1866) 45 (full title and outline); Gar (1868) 268.

1819. *System of Fortia d'Urban.*

FORTIA D'URBAN, Agricole. Nouveau sistême de bibliographie alfabetique . . . ed. 2. Par., 1822, 12°.
Constantin (1842) 186-7; Petzholdt (1866) 47-8 (full title and outline); Gar (1868) 269; Maire (1896) 197-8 (outline.)

1819. *System of Schrettinger.*

SCHRETTINGER, Martin. Versuch eines vollständigen lehrbuchs der bibliothekswissenschaft . . . Mün., 1829, 8°.
Constantin (1842) 196; Petzholdt (1866) 49 (full title and outline); Gar (1868) 269; Clarke, in: The Library 10 (1898) 391-2.

1821. *System of Thun.*

THUN, Johann Paul. Neues büchverzeichniss. Lpz., 1843-48, 8°.
Constantin (1842) 195-6; Petzholdt (1866) 49-50 (full title and outline); Gar (1866) 269-70 (outline.)

1825. *Second System of Horne.*

HORNE, Thomas Hartwell. Catalogue of the library of Queen's College, Cambridge . . . Camb. (Eng.,) 1827, 2 v., 8°; also in: Outlines for the classification of a library. Lond., 1825, 4° (100 copies.)
Edwards 2 (1859) 793-6, Table 2, no. ix. 3 (modification of Bouillaud); Petzholdt (1866) 50 (full title and outline); Brown (1898) 43-4 (outline.)

1826. *System of Reuss.*

REUSS, Ferdinand Friedrich. Ordo Bibliothecae Universitatis Caesareae Mosquensis. Mosquae, 1826, 4°.
Petzholdt (1866) 50-51 (full title and outline); Gar (1868) 270; Flint, in: Presb. R. 6 (1885) 435 (mention.)

1826. *System of Pipitone.*

PIPITONE, Stefano. Discorso ossia Progretto di un nuovo piano di classificazione. Palermo, 1826, 100 p., 8°.
Gar (1868) 270 (full title and outline.)

1827. *System of Mortillaro.*

MORTILLARO, Vincenzo. Studio bibliografico. Palermo, 1827, 8°; also 1832, 8°.
Petzholdt (1866) 51 (full title and outline); Gar (1868) 270.

1828. *System of the Tableau compare des productions bibliographiques.*

TABLEAU COMPARE DES PRODUCTIONS BIBLIOGRAPHIQUES. Quoted in: Bailly. Notices sur les bibliothèques. Paris, 1828, 8°.
Edwards 2 (1859) 796, Table 2, no. ix. 4 (modification of Bouilleaud.)

1834. *First System of Namur.*

NAMUR, P. Manuel du bibliothécaire . . . Bruxelles, 1834, 8°.
Petzholdt (1866) 51-2 (full title and outline); Gar (1868) 271 (outline.)

1835. *System of Thienemann.*

THIENEMANN, T. G. Verzeichniss eines ansehnlichen theils der bibliothek zu Rochlitz. . . . Lpz., 1835. Repr. in: Serapeum, 8 (1847) Intelligenzblatt 155-158, 161-166.
Edwards 2 (1859) Table 2, no. xiv., "too fine spun for common use"; Petzholdt (1866) 52-3 (full title and outline); Gar (1868) 271-2.

1835. *System of Friedrich.*

FRIEDRICH, Joh. Cph. Kritische erörterungn. zum übereinstimmenden ordnen und verzeichnen öffentlicher bibliotheken. Lpz., 1835, 8°.
Petzholdt (1866) 52 (full title and outline); Gar (1863) 271.

1835. *System of the London Institution.*

THOMSON, R., Bragley, E. W., and Maltby, William. Catalogue of the library of the London Institution systematically classed. Lond., 1835.
Brown (1898) 44.

1836. *System of the British Museum.*

GARNETT, *R.*. On the system of classifying books on the shelves followed at the British Museum. Lib. J. 2 (1877) 194-200 [descriptive outline] same art. Trans. of Conference of Librarians. Lond., 1877, 108-114. 188-193.
Harris, G. W. The British Museum system of press-numbering. In: Library Journal, 12 (1887) 331-4.
Fumagalli (1890) 107-8; The Library 9 (1897) 205 (10 class outline); Brown (1898) 45-8 (outline.)
I., Theology; II., Jurisprudence; III., Natural history and Medicine; IV., Archæology and arts; V., Philosophy;; VI., History; VII., Geography; VIII., Biography; IX., Belles Lettres; X., Philology.

1837. *System of Aime-Martin.*

AIME-MARTIN, L. Plan d'une bibliothèque universelle . . . Bruxelles, 1837, 12°.

Petzholdt (1866) 53 (full title and outline); Gar (1866) 272.

1838. *System of Levot.*

Levot, Prosper Jean. Catalogue géneral des livres composant les Bibliothèques du Département de la Marine et des Colonies. Par., 1838-43. 5 v., 8°.
Petzholdt (1866) 53-4 (full title and outline); Gar (1868) 272.

1838. *System of Bliedener.*

[Bliedener, Alexander.] Kayser. Vollständiges Bücher Lexicon, Sachregister. Leipzig, 1838.
Petzholdt (1866) 53 (full title and outline); Gar (1868) 272; Maire (1896) 214 (outline.)

1839. *System of Muquardt.*

Muquardt, C. Bibliographie de la Belgique ou catalogue général de l'imprimerie et de la librairie Belges . . . Bruxelles, 1838, 8°.
Petzholdt (1866) 54 (full title and outline); Gar (1868) 272.

1839. *Second System of Namur.*

Namur, A. Catalogue de la bibliothèque de l'Athénée Royal Grand-Ducal de Luxembourg . . . Luxembourg, 1855, 8°.
Namur, A. Projet l'un nouveau système des connaissances humaines. Bruxelles, 1839, 8°.
Petzholdt (1866) 54-5 (full title and outline); Gar (1868) 272 (men.)

1839. *System of Preusker.* (Lib'y of Grossenhain.)

Preusker, Karl. Wissenschaftliches System einer Aufstellung stälicher Bürger- u. andere biblioiheken, in: Serapeum (1850) Intelligenz-Blatt, p. 97-101; also separately Miessen, 1850, 8°.
Preusker, Karl. (Die) stadt-bibliothek in Grossenhain, etc. Grossenhain, 1836, 3 Aufl., 1841; 4 aufl., 1847, 8°; 1853, 8°.
Edwards 2 (1859) Table 2, no. xvii.; Petzholdt (1866) 55 (full title and outline); Gar (1868) 272:

1840. *System of Lehmann and Petersen.*

Lehmann, J. G. C., and Petersen, C. Ansichten und baurisse der

neuen gebäude für Hamburgs öffentliche bildungsanstalten, kurz besschrieben und in verbindung mit dem plan für die künftige Aufstellung der Stadtbibliothek herausgegeben. Hamburg, 1840; also in: Serapeum 8 (1847) Intelligenzbl. 169-73, 177-83, 185-91, 9 (1848); Intelligenzbl. 1-7, 9-12, 17-22, 25-29, 33-40, 41-48, 49-55, 57-63, 65-71, 73-74.
Petzholdt (1866) 55-6 (full title and outline); Gar (1868) 272-3; Fumagalli (1890) 111 (F. gives 18 classes (A-S). A has 48 subdivisions, G 195, etc.)

1841. *System of Rossi.*

Rossi, Francesco. Cenni storici e descrittivi intorno all' I. R. biblioteca di Brera. Milano, 1841, 8°, p: 23-71.
Petzholdt (1866) 56 (full title and outline); Gar (1868) 273.

1841. *System of Park.*

Park, Roswell. Pantology or a systematic survey of human knowledge. 1841, 8°; 3 ed. 1843, 8°.
Shields, Philosophia Ultima 2 (1889) 61 ("bibliographical.")

1842. *System of Merlin.*

Merlin, R. Catalogue de la bibliothèque de Sylvestre de Sacy: Par., 1842-47, 3 v:, 8°, v. 3, xx-xxiv.
Merlin, R. Classification of works into catalogues. In: Norton's Literary Register, 1854, p. 81-4.
Edwards 2 (1859) p. 801-4, Table 1, no. xi.; Petzholdt (1866) 57 (full title and outline); Gar (1868) 273.

Outline.

I. Philosophy.
II: Theological sciences.
III. Cosmological sciences.
1. Mathematical science.
2. Physical science.
3. Astronomical science.
4. Geological science.
5. Mineralogical science.
6. Phytological science.
7. Zoological science.
8. Anthropological science.

Individual man.
  Physical.
  Moral.
Society.
Social or Political sciences.
  Historical sciences.

This extremely interesting classification is "based upon the logical classification of the sciences." Merlin advocated classifying by "the objects" "arranged in the organic scale of being . . according to the chronological order of creation, that is to say, arising from the most simple to the most perfect." Substitute complex for perfect, and here we have the modern evolutionary conception in its plainest form applied to books. It is amusing at this day to note that Edwards, criticising the system of Merlin, in 1859 calls evolution "that theory—graceful but unsound—which had so many charms in its early stages" a philosophical blunder. "What sort of a science of palæontology," he asks, "should we now possess had all who cultivated it insisted on working it out under the supremacy of that theory?" It is a matter of extreme interest to American libraries that at that famous convention of 1853, from which most that is practical in modern library method sprang, the first library plea for an evolutionary system of classification for books was presented. We have seen "what sort of a science of palæontology" the application of this theory has produced, and it seems clear that if M. Merlin had been more successful as a promoter, and the same theory had been as rigidly applied to library classification as it was to palæontology, we should have been much farther advanced in the matter at the present day.

1843. *System of Munich Royal Library.*

LAUBMANN, Georg von. Plan und classifications-normativ der K. Hof- und Staatsbibliothek zu München. Nebst einem Anhang über die augstellung u. beschreibung der bücher. (Ms. sent Fumagalli.)
Fumagalli (1890) 120.2. 12 main classes (given) with 182 subdivisions. Each class is arranged in three sizes, then in general alphabetical Latin abbreviation notation, *e. g.*, "Num, rec." Recent Numismatics. The Volg. eloq. of Dante, tr. Trissino 1868 is "P. o. ital. 8°, 341 gnd."

1844-1848. *System of Ilari.*

ILARI, Lorenzo. (La) Biblioteca pubblica di Siena . . . Siena, 1844 48, 7 v. in 8, 4°.
Gar (1868) 273 (title and outline.)

1847. *System of Paulin Paris.*

PARIS, Paulin. De la bibliothèque royale. Par., 1847, 8°.
Petzholdt (1866) 58-9 (full title and outline); Gar (1868) 274.

1849. *System of the Commercial Lib., Hamburg.*

HOFFMAN. Die Commerz-Bibliothek in Hamburg. Hamb., 1849, p. 24, 8°.
Edwards 2 (1859) Table 2, no. xvi.

1850. *System of Cardile.*

CARDILE, Giuseppe. Studii fondamentali della scienza bibliografica. Palermo, 1850, 8°.
Gar (1868) 274 (5 lines.)

1850. *System of Narbone.*

NARBONE, Alessia. Bibliografia Sicola sistematica, o apparato metodico alla storia letteraria della Sicilia. Palermo, 1850-55, 4 v. also in: Rivista di scienze (Palermo) no. 22-4.
Gar (1868) 274-5 (title.)

1852. *System of Schleiermacher.*

SCHLEIMACHER, A. A. E. Bibliographisches system der gesammten wissenschaftenskunde mit einer anleitung zum ordnen von biblioteken. Braunschweig, 1847; also 1852, 8°; also in: Petzholdt. Neuer anzeiger (1853) p. 30-32, 205-208.

Edwards 2 (1859) 806-8, Table 2, no. xviii.; Petzholdt (1866) 59 (full title and outline); Gar (1868) 275; Gräsel (1890) 153 (outline); Fumagalli (1890) 113-4; Brown (1898) 48 (outline.)
Contains 12,915 classes in 25 main classes. Fum. gives 25 classes (a-z).

1853. *System of the Leipziger "Messkatalog."*

MESSKATALOG. Lpz., 1853, sq. 8°.
Petzholdt (1866) 59-60 (full title and outline); Gar (1868) 275 (outline.)

1853. *System of Walckenaer.*

WALCKENAER, Baron. Catalogue des livres de [sa] bibliothèque. Par., 1853, 8°; also in: Serapeum (1854) Intelligenzbl. 41-44, 49-52, 57-60.
Petzholdt (1866) 60-1 (full title and outline); Gar (1868) 275.

1853. *System of Wiener.*

WIENER, Hermann. Catalogue de la bibliothèque cantonale Vaudoise. Lausanne, 1856, 8°; also in: Serapeum 19 (1858) Intelligenzbl. 89-93, 97-101, 105-109, 113-117.
Petzholdt (1866) 60-1 (full title and outline); Gar (1868) 276.

1854. *System of Palermo.*

PALERMO, Francesco. Classazione dei libri a stampa dell' I. e R. Palatina in corrispondenza di un nuovo ordinamento dello scibile umano. Firenze, 1854, 4°.
Petzholdt (1866) 61 (full title and outline); Gar (1868) 276-7 (full outline); Fumagalli (1890) 94-5.
22 main classes with minute subdivisions (392 under History.) Fum. gives the 22 main classes.

1855. *System of Pilz.*

[PILZ, Oscar.] Wissenschaftskunde. In: Rottner, Albert. Lehrbuch der contorwissenschaft. Ed. 2. Lpz., 1861, 4°, p. 287-334.
Petzholdt (1886) 61 (full title and outline); Gar. (1868) 277.

1855. *System of Lebas.*

Maire (1890) 224-9 (outline); Libr'y Jour. 22 (1897) 253. A French classification and notation (outline).
System used in the Sorbonne and in the Superior Normal School of Paris. Its essence is the abbreviation notation, *i. e.*, T—Theology, TC—Councils, TP—Polemic, etc.

1855. *System of the Palermo Communal Library.*

Indice topografico ed alfabetico della biblioteca del Comune di Palermo. Palermo, 1855, v. 1, p. x., 8°.
Mira 2 (1862) 203-8.

1856. *System of Tiele.*

[Tiele.] Catalogue van de bibliotheek der stad Amsterdam. Amst., 1856-58, 4 pt., 8°.
Petzholdt (1866) 61-2 (full title and outline); Gar (1868) 277 (outline).

1856. *System of Trömel.*

Trömel, Paul. Allgemeine bibliographie; monatliches verzeichnis. Lpz., 1856, 8° (still in use in same periodical.)
Petzholdt (1866) 62 (full title and outline); Gar (1868) 277 (outline).

1856. *System of Merleker.*

Merleker, Karl Friedrich. Musologie . . Lpz., 1857, 8°.
Petzholdt (1866) 62-3 (full title and outline); Gar (1868) 278.

1857. *System of Vincent.*

Vincent, Benj. The classified catalogue of the library of the Royal Institution. Lond., 1857.
Brown (1898) 49-50 (outline).

1859. *System of Edwards.*

Edwards, Edward. Memoirs of libraries. Lond., 1859, 8°, v. 2, p. 814-831: Outline of proposed scheme of classification for a town library.
Petzholdt (1866) 63-4 (full title and outline); Gar (1868) 278-9 (outline); The Library 9 (1897) 204 (outline); Brown (1898) 50-54 (outline).
I., Theology; II., Philosophy; III., History; IV., Politics and Commerce; V., Scienees and arts; VI., Literature and Polygraphy. About five hundred classes given.

Extreme notation "Class V., Div., 1, Sec. c, ii. (2)"—Organic Chemistry.

1859. *System of Eyre.*

EYRE, Samuel. Book classing systematized. Lond., 1843, f°.
Edwards 2 (1859) 805-6 (23 classes in 4 given); Petzholdt (1866) 63 (full title and outline); Gar (1868) 278.

1859. *System of Trübner.*

TRÜBNER, Nicolas, comp. and ed. Bibliographical guide to Amer. literature . . . Lond., 1859, 8°.
Petzholdt (1866) 64 (full title and outline); Gar (1868) 279; Brown (1898) 50 (outline).

1861. *System of Mira.*

MIRA, Giuseppe. Manuale teorico-pratico di bibliografia. Palermo, 1861-62, 2 v., 2-227-9. (Elaborate series of folding tables.)
Gar (1868) 279-80.

1862. *System of Wuttig.*

WUTTIG, G. Universal-bibliographie. Lpz., 1862.
Petzholdt (1866) 65 (full title and outline).

1863. *System of Starrabba.*

STARRABBA, Raffaele, baron. Progetto di classificazione di una biblioteca. Palermo, 1863, 8°.
Gar (1866) 280 (rather full outline).

1863. *System of Seizinger.*

SEIZINGER, G. Theorie und praxis der bibliothekwissenschaft . . . Dresden, 1863, 8°. 52-175, and on Notation 175-85.
Gar (1868) 279.
S. gives 32 main classes with full and detailed subdivisions, and gives under each class explicit description of what is included. An unusual and admirable method.

1865. *System of Gar.*

GAR, Tommaso. Letture di bibliologia. Torino, 1868, 8°. Table opposite p. 188.

1865. *System of Lesley.*

BRUNET, Gustav. In: Chronique du Journal gén. de l'Impr. 2 ser. 9 (Paris, 1865.)
Gar (1868) 280-1 (good outline.)

1866. *System of Petzholdt.*

PETZHOLDT, J. [System of the library at Dresden.] In: Bibliotheca Bibliographica. Lpz., 1866, 8°, p. 62 (under System von Trömel.)

1869. *System of Techener.*

TECHENER, Joseph Léon. Répertoire universel de bibliographie. Paris, 1869, 8°.
Rouveyre 2 (1882) 50-58 (very detailed.)

1870. *System of the Athens National Library.*

STEFFENHAGEN, E. Die neue ordnung und katalogisirung der Athener Nationalbibliothek, in: Neuer Anzeiger (1868) no. 704; (1869) no. 762; (1870) no. 821; (1874) no. 451.
Gräsel (1890) 386 and 388.
Alphabetical system.

1870. *System of W. T. Harris.*

HARRIS, W. T. Catalogue of the St. Louis Public School Library. St. Louis, 1870, 8°, p. 3-16.

HARRIS, Wm. T. Book classification. In: Jour. Spec. Philos. 4 (1870) 114-9.
Public Libraries in the U. S. 1 (Wash., 1876) 660-2 (outline.)
The Library 9(1897) 205 (outline); Crunden, Frederick M. Classification and cataloguing. Library 1 (1900) 295-8; Brown (1898) 63-5 (outline).

1870. *System of Manasia.*

MANASIA, Calogero. Classificazione della biblioteca communale di Caltanisetta. Caltanisetta, 1870.
Fumagalli (1890) 98-9 (gives 6 classes).
Strict subject arr., no distinction of size.

1871. *System of Battezzati.*

BATTEZZATI, Natale. Nuovo sistema di catalogo bibliografico generale [referred to by Dewey ed. 1876, not seen. System proposed in the Bibliografia Italiana, nov. 30, 1871, is substantially that of Brunet.]

1871. *System of Förstemann.*

FÖRSTEMANN, E. W. Mittheilungen aus der verwaltung der Königl. Oeffentlichen Bibliothek zu Dresden in den jahren 1866-1870, 1871-1875, 1876-1880. Dresden, 1871, 1876, 1881.
Ebert, F. A. Geschichte und beschreibung der Dresdner Bibliothek, p. 89, ff.
Förstemann, Systematische, alphabetische, chronoligische anordnung, in: Centralblatt für Bibliothekswesen, 1 (1884) 293-303.
Fumagalli (1890) 114-5.
288 classes, Notation—the abbreviated Latin name (classes arranged for the most part methodically, but some alphabetically and chronologically.)

1876. *System of the Madrid National Library.*

Breve noticia de la Biblioteca Nacional. Madrid, 1876.
Fumagalli (1890) 125-6.

1876. *System of Dewey.*

DEWEY, Melvil. Decimal classification and relativ index for libraries, clippings, notes, etc. Fourth edition, revised and enlarged. Boston Library Bureau, 1891, p. 593, 8°. Earlier editions: 1st, 1876; 2d, 1885; 3d, 1888; repr. 1894.
Dewey, Melvil. Decimal classification. Edition 7. Lake Placid Club: Forest Press, Boston: Library Bureau 1911.
Dewey, Melvil. Abridged decimal classification and relativ index for libraries, clippings, notes, etc. Bost., [1894,] 8°.
U. S. Bureau of Ed. Catalog of the "A. L. A." Library. Washington, 1893, 8°, p. 39 (outline 100 classes. The most accessible illustration of the system, here applied to 5000 select volumes.)

Translations: *Italian,* by Mondino, Palermo, 1895; by Benedetti, Firenze, 1897; *French,* Bruxelles, 1895, (1000 schedules); do. 1897 (tables générales abr.) and do. 1899 (of the nature of a new edition by the Institut internat.); *Spanish,* by Castillo, Salamanca, 1897; *German,* by Junker, Wien, 1897. It is impossible to attempt here anything like a bibliography of the immense literature of the Dewey system. References and discussions may be found *passim* in all the library periodicals—German, French and Italian as well as British and American. Following are only a few out of very many articles. For other literature consult Kephart in the World's Congress Papers, and especially the publications of the Institut international de bibliographie.
Dewey, Melvil. A decimal classification and subject index. In: U. S. Bureau of Ed., Public Libraries of the U. S., etc. (Wash., 1876) 623-48. Gräsel (1890) 154-5, 387; Fumagalli (1890) 126-128, etc. (gives 10 divisions and full discussion); Maire (1896) 218-9 (outline); Brown (1898) 67-71 (outline); The Library 7 (1895) 341; 8 (1896) 335-50 (Jast); 8 (1896) 379-80; 8 (1896) 482-90 (Lyster); 9 (1897) 329-39 (Lyster); 9 (1897) 340-45 (Jast); 9 (1897) 346-9 (Peddie); 10 (1898) 97-9 (outline). Library Journal 3 (1878) 231 (Dewey); 4 (1879) 117-20; 191-4 (Dewey); (1879) 149-52 (Lindsay); 7 (1882) 127-8 (Larned); 10 (1885) 258 (Lane); 11 (1886) 37-43 (Perkins and Schwartz); 11 (1886) 100-104 (Dewey); 23 (1898) 18-22 (Wire); 24 (1899) For later literature, see Cannons and Brown.

Outline.

000 *General Works.*
010 Bibliography.
020 Library Economy.
030 General Cyclopedias.
040 General Collections.
050 General Periodicals.
060 General Societies.
070 Newspapers.
080 Special Libraries. Polygraphy.
090 Book Rarities.
100 *Philosophy.*
110 Metaphysics.
120 Special Metaphysical Topics.
130 Mind and Body.

140 Philosophical Systems.
150 Mental Faculties. Psychology.
160 Logic.
170 Ethics.
180 Ancient Philosophers.
190 Modern Philosophers.
200 *Religion.*
210 Natural Theology.
220 Bible.
230 Doctrinal Theol. Dogmatics.
240 Devotional and Practical.
250 Homiletic. Pastoral. Parochial.
260 Church. Institutions. Work.
270 Religious History.
280 Christian Churches and Sects.
290 Non-Christian Religions.
300 *Sociology.*
310 Statistics.
320 Political Science.
330 Political Economy.
340 Law.
350 Administration.
360 Associations and Institutions.
370 Education.
380 Commerce and Communication.
390 Customs. Costumes. Folk-lore.
400 *Philology.*
410 Comparative.
420 English.
430 German.
440 French.
450 Italian.
460 Spanish.
470 Latin.
480 Greek.
490 Minor Languages.
500 *Natural Sciences.*
510 Mathematics.
520 Astronomy.
530 Physics.
540 Chemistry.
550 Geology.
560 Paleontology.

570 Biology.
580 Botany.
590 Zoology.
600 *Useful Arts.*
610 Medicine.
620 Engineering.
630 Agriculture.
640 Domestic Economy.
650 Communication and Commerce.
660 Chemical Technology.
670 Manufactures.
680 Mechanic Trades.
690 Building.
700 *Fine Arts.*
710 Landscape Gardening.
720 Agriculture.
730 Sculpture.
740 Drawing. Design. Decoration.
750 Painting.
760 Engraving.
770 Photography.
780 Music.
790 Amusements.
800 *Literature.*
810 American.
820 English.
830 German.
840 French.
850 Italian.
860 Spanish.
870 Latin.
880 Greek.
890 Minor Languages.
900 *History.*
910 Geography and Description.
920 Biography.
930 Ancient History.
940 Modern. Europe.
950 Asia.
960 Africa.
970 North America.
980 South America.
990 Oceanica and Polar Regions.

The system contains in its various summaries 10, 100, 1000 and, roughly speaking, 10,000 divisions. In the notation, however, the main subject stops with the use of three figures, the decimal point is then introduced and further divisions are of irregular minuteness of subdivision, and are regarded as beginning a new series of classes.

This system begun in 1873, first published in 1876, published in fourth edition in 1891 and reprinted, and now perhaps shortly to be published again in new edition, has probably had more vogue than any other bibliographical system ever published save possibly that of Brunet. Taken as a whole and regarding the substantially unchanging form and notation, among the multitude of derived systems with minor variations, it is undoubtedly true that no system ever invented has been applied to as many libraries (probably at the present day several thousand) as this. In many libraries considerable changes have been made, but in the majority it remains practically unchanged. It is now being adopted very generally on the continent of Europe by booksellers even as well as libraries, and is of late, through its adoption by the Brussels Institut, having a very zealous propaganda by its converts, especially in France and Italy. Many of the most noteworthy partial classifications of the present day are avowedly founded on and are enlargements of this system. The system itself is supposed to be in some way an adaptation of Bacon, but the relation is hardly to be discovered and it really should be counted as independent. The reasons for its deserved popularity are to be found: (1) in an intelligent and consistent application of the decimal notation (not new with Dewey, but first by him vigorously and consistently applied); (2) in the grasp of mnemonic possibilities of this situation; (3) in the practical, intelligent and often up to date management of the remoter subdivisions of the, in some places, somewhat artificial, larger sub-classes; (4) in the fully printed schedules with their "relativ index," which more than anything else is the cause of the practicality of this system and its wide adoption. In other words, its popularity has been due to intelligent practical usefulness.

Random Examples of the Dewey Notation.

974.4 Ad 1 Adams, C. F. Massachusetts.
624 Ad 1 Adams, Henry. Structural ironwork.
295 A 3 Avesta. Zend-Avesta; tr. Darmesteter. 1898.
372.2 H 19 Hauschmann. Kindergarten system.

1879. *System of Schwartz.*

SCHWARTZ, J. A mnemonic system of classification; Lib. J. 4 (1879) 1-7.

Schwartz, J. A new classification and notation. In: Lib. J. 7 (1882) 148-66.

Library Journal 4 (1879) 92 (Schwartz) 7 (1882); 251 (Bliss); 272 (Schwartz); 10 (1885) 25-7, 77-8, 149-50, 174-5, 371-5 (Schwartz); 257 (Lane); 11 (1886) 8-9 (Cutter and Lane); 9 (Schwartz); Gräsel (1890) 387; Fumagalli (1890) 131-2; Brown (1898) 65-6 (outline.)

Kephert, Horace. Classification. In (World's Library Congress Papers) U. S. Education Rep., 1892-3, p. 874.

This gives a new and presumably final form of Schwartz System, as follows: 0, Fiction; 1, Biography; 2, History and geography; 3, Political and Social science; 4, Philosophy and theology; 5, Natural science; 6, Useful and fine arts; 7, Language and literature; 8, Foreign literature (in other languages than English); 9, Polygraphy.

1879. *System of Cutter.*

CUTTER, C. A. Expansive classification. Boston, C. A. Cutter, 1891-3, 160 p., 8°. (Six expansions. The seventh, very minute, is published in part and is very near completion.)

Cutter, C. A. Classification on the shelves with some account of the new scheme prepared for the Boston Athenæum. Lib. J. 4 (1879) 234-43.

U. S. Bureau of Ed. Catalog of the "A. L. A." Library. Washington, 1893, 8°, p. 147 (outline of about 110 classes. The best illustration of the system as it is applied here, complete to 5000 volumes.)

Cutter, C. A. The Expansive Classification. In: Trans. Internat. Library Congress. Lond. (Lond., 1898) 84-8.

Cutter's Expansive Classification. The Library 10 (1898) 98, 286 (outline.)

Cutter, Charles A. Suitability of the Expansive Classification to college and reference libraries. In: Lib. Journal 24 (1899) 41-49.

As in the case of the Dewey system, the literature of the Cutter system is already formidable and is increasing. Following are a few references:

Lib. Jour. 10 (1885) 55-6; 14 (1889) 242-4 (Bliss); 17 (1892)

228 (Kephart); 23 (1898) 18-22 (Wire); 24 (1896) c. 154-6; Fumagalli (1890) 129-31; The Library 9 (1897) 205-6; Brown (1898) 73-7 (Outline.) Compare also literature in Kephart's World's Congress paper.

Outline of Fifth Expansion (revised to 1901).

A General works, covering several classes.
Includes: Ad Dictionaries, Ae Encyclopædias, Ai Indexes. Am Museums (General), An Notes and Queries, Ap Periodicals (General), Aq Quotations, Allusions, etc., Ar Reference books, As Societies (General.)

B Philosophy; Br. Religion.
Includes: Ba-Bf National philosophies and systems of philosophy; Bg Metaphysics, Ontology, Bh Logic, Bi Psychology, Bm Moral philosophy, Br Religion; general works on religion and the Supernatural, Bs Natural theology, Bt Religions, Bu Superstitions, Folk-lore, Bz Local religions.

C Christianity and Judaism.
Includes: Ca Judaism, Cb Bible, Cc Christianity.

D Ecclesiastical history.
Includes: Dd Church history of countries, Dg Catholic Church, Dj Reformation, Dk Protestants.

E Biography.

F History.
Includes: Universal, Ancient, Medieval, Modern; Single countries (local list), Fc Chronology, Fd Philosophy of history, Fe History of civilization and culture, Ff Antiquities, manners and customs, Fi Inscriptions, Fn Numismatics, Fs Chivalry, Ft Knightly orders, Fv Heraldry, Fw Peerages, Nobility.

G Geography and Travels.
Includes: Ge Mathematical geography, Gs Surveys, of all sorts, Gz Maps.

H Social sciences.
Includes: Hb Statistics, Hc Economics, Political economy.

I Demotics, Sociology.
Includes: Ib Crime, Criminal classes, Ig Charity, the Poor, Ih Providence, Ik Education.

J Civics, Government, Political science.
Includes: Jx Law of nature and nations, Jy International law.

K Legislation, etc.

Includes: Ka Law, Kw Woman, Kx Children, Kz Societies not otherwise provided for.

L Sciences and Arts together.

Includes: La Sciences (Natural), Lb Mathematics, Lh Physics or Natural philosophy, Lo Chemistry, Lr Astronomy.

M Natural history.

Includes: Mb Microscopy, Mc Geology, Md Mineralogy and Lithology, Me Crystallography, Mg Physiography, physical geography, Mp Palaeontology, Mu Biology.

N Botany.

O Zoology.

Pw Anthropology and Ethnology.

Includes: Pwa Geological man, Px Ethnology (primitive and historic man), Py Ethnography (races of men).

Q Medicine

R Useful Arts; Technology.

Includes: Ra Exhibitions, Rb Patents, Rc Metric arts, Weights and measures, Rd Mining, Re Metallurgy, Rf Agriculture, Rj Animal culture, Rq Chemical technology, Rt Electric arts, Ry Domestic economy, Rz Food and cookery.

S Constructive arts (Engineering and building).

S Engineering.

Includes: Sg Building, Sj Sanitary engineering, Sl Hydraulic engineering, St Arts of transportation and communication, Su Roads, Highways, Streets, Sv Railroads.

T Manufactures and Handicrafts.

U Art of war.

Includes: Un Nautical arts, Uu Ships, Shipbuilding, etc., Uv Lighthouses, Uw Life-saving service, Ux Shipwrecks, Uy Fire extinction, Fires.

V Recreative arts, Sports, Games, Festivals.

Includes: Vr Jugglery, Ventriloquism, Natural magic, Vs Gymnastics, Physical education, Vt Theatre, Vv Music.

W Art.

Includes: We Lanscape gardening, Wf Architecture, Wj Sculpture, Wk Carving and Turning, Wl Arts of design, graphic arts, Wm Drawing, Wp Painting, Wq Engraving, Wr Photography, Ws Decorative arts, Ornament, Wt Mosaic, Wu Needlework and textile decoration, Wv Costume and its adjuncts, Ww Furniture, Wx Jewelry, Silver and Gold-smithing, Wy Metal work, Wz Bric-a-brac.

X Philology.

Includes: Xd Language in general, Xy English language.

Y English and American literature.

Includes: Yf Fiction, Yj Juvenile literature, Yd Literature in general.

Z Book arts.

Includes: Za Authorship, Rhetoric, Zd Writing, Zh Printing, Zk Binding, Zl Publishing and Bookselling, Zn Private libraries, Zp Public libraries, Zu Bibliography, Zw Subject bibliography, Zx Selection and methods of reading, Zy Literary history, Zz National bibliography.

Although not published very fully until 1891, some account of the system was published as early as 1879, and the fifth expansion was finished in 1882.

In 1891-3 it was published fully in six expansions, and the seventh, which will contain about 10,000 subdivisions, is now nearing completion. It is distinguished as being the most logical and modern in its nomenclature of the recent systems. It applies a consistent alphabetical notation in a manner which is an advance on all such attempts previously made. It is coming into use in a good many American libraries, and when the final expansion is finished and provided with an index will undoubtedly be more used still. The painstaking intelligence of subdivision and the full description of exact meaning of what is intended to be included under the subdivision are of the highest order, both of scholarship and method. The author's unsparing industry and unwearied enthusiasm for his scientific aim and the welfare of libraries have produced a really scientific (though of course not perfect or final) work of high value, the appreciation of which on the part of others is all the more cordial because of the modesty and unaffected altruism of its author.

The proper understanding of the substantial excellences of this system really requires a presentation of Cutter's admirable "Local list," now used with many other systems as well, and the "Cutter author number," now used with most systems, but the limits of the method chosen for this appendix forbid.

Random Examples of the Cutter Notation.

F 844.Ad1 Adams, C. F. Massachusetts.
SE.Ad1 Adams, Henry. Structural ironwork.
BZEP.A3 Avesta. Zend-Avesta; tr. Darmesteter. 1898.
IU.H19 Hauschmann. Kindergarten system.

1880. *System of Allibone.*

ALLIBONE, S. Aug. A critical dictionary of English literature and British and American authors. Philadelphia, 1880, 3 v., 8°.
Maire (1896) 217 (gives outline of names in index.)

This, as quoted by Maire, is not properly a system—or rather it is merely the alphabetical subject system. Allibone does, however, in introd. adopt from Putnam's World's progress the classification "Imagination, Fact, Speculative and Scientific."

1880. *System of Lorenz.*

LORENZ. Catalogue général de la librairie française. Tableau systematique ou résumé des rubriques de la table des matieres. v 8 (Paris, 1880) 673-84.
Maire (1896) 210-11 (outline.)

1881. *System of Perkins.*

PERKINS, Fred. C. San Francisco Cataloguing for public libraries. A manual of the system used in the San Francisco Free Public Library. San Francisco, 1884, p. 40.
Perkins, Fred. B. A rational classification of literature for shelving and cataloguing books in a library. Revised edition. San Francisco, 1882. 57 + 4 p. 8°.
Dewey, Melvil. Mr. Perkins' classification. Lib. Jour. 7 (1882) 60-2.
Fumagalli (1890) 135 (5572, in 69, in 8 classes. 8 given by F.); Brown (1898) 77-9 (outline.)
For other references see Kephart, p. 895.

1881. *System of the Italian Chamber of Deputies.*

La biblioteca della Camera dei Deputati nel dicembre dell'anno 1881.
Notizie pubblicate per cura della commissione della Biblioteca. Roma, 1881.
Fumagalli (1890) 99 ("A few large classes.")

188[illegible]. *System of the Berlin Royal Library.*

Uebersicht der systematischen ordnung der Königlichen Bibliothek zu Berlin, Juli, 1882.
Fumagalli (1890), 111:

177 main classes.

1882. *System of Smith.*

SMITH, Lloyd P. The classification of books. In: Lib. J. 7 (1882) 172-174.

Smith, Lloyd P. On the classification of books. A paper read before the American Library Association, May, 1882. Bost., 1882, 70 p. 8°.

Fumagalli (1890) 134-5; Brown (1898) 79-80 (outline.)

A, Religion; E, Jurisprudence; I, Sciences and Arts; O, Belles-Lettres; U, History; Y, Bibliography and the history of literature.

1883. *System of Edmands.*

EDMANDS, John. New system of classification, etc. Phila., 1883, 29 p. 8°.

Lib. Jour. 4 (1879) 38-40, 42-4, 56. Brown (1898) 82.

1883. *System of Steffenhagen.*

STEFFENHAGEN, Emil. Ueber normalhöhen fur büchergeschosse. Eine bibliothektechnische erörterung, mit einem anhange, enthaltend den aufstellungsplan der Kieler Universitäts-Bibliothek. Kiel, 1885.

Steffenhagen, E. Ordnungsprincipien der Universitäts-Bibliothek. Kiel. Für den dienstlichen gebrauch zusammengestellt. Als manuskript gedruckt. Burg, 1885.

Steffenhagen, E. Die neue aufstellung der Universitätes-Bibliothek zu Kiel. Eine denkschrift zur orientirung. Als manuskript vervielfältigt. Kiel, 1883.

Steffenhagen, E. Standorts-Tabelle über die neue aufstellung der Universitäts-Bibliothek zu Kiel. Kiel, 1884.

Fumagalli (1890) 119-120.

"Scrupulously systematic." 25 main classes given by Fumagalli, 124 sub-classes. Three-form series.

1883. *System of the Austro-Hungarian Libraries.*

GRASSAUER, Ferdinand. Handb. f. oesterr . . . Bibliotheken. Wien, 1883, p. 133, 196.

Fumagalli (1890) 123-4.

Rules call for two main principles: (a) logical by subjects, (b) with the object of "having the library preserve a pleasing exterior appearance."

1883. *System of the Public Libraries of France.*

ROBERT, Ulysse. Recueil de lois, décrets, ordonances, arrêtes, circlaires, etc., concernant les biliothèques publiques, communales, universitaires, scolaires et populaires. Paris, 1883, p. 121.
Fumagalli (1890) 102-3.
Three sizes, accessions order, folios and over 1-9999, quartos, etc., 10000-29,999, octavos and under 30,000 sq.

1884. *System of the Mazarin Library.*

RAPPORT de M. Alfred Franklin, administrateur de la bibliothèque Mazarine, etc., in: Bulletin des Bibl. (1884) 25.
Fumagalli (190) 101-2 (Classification by subjects long given up. Now strictly (1) by three sizes; (2) order of accession in each.)

1884. *System of the Paris Arsenal Library.*

RAPPORT de M. Edouard Thierry, conservateur-administrateur de la bibliothêque de l'Arsenal, etc., in: Bulletin des Bibl. (1884) 172.
Fumagalli (1890) 102. Originally classed, overcrowded, then by order of accession.

1885. *System of the St. Geneviève Library.*

RAPPORT de M. Lavoix, administrateur de la bibliothèque. Cainte-Geneviève, etc., in: Bulletin des Bibl. (1885) 136.
Fumagalli (1890) 102 (outline. 28 classes much the same as those of Bib. Nat. Since 1875 arranged in each class in the order of accession.) Maire (1896) 230-31.

1885. *System of the Heidelberg Univ. Lib.*

ZANGEMEISTER, Karl. System des Real-Katalogs der Universitäts-Bibliothek Heidelberg. Heidelberg, 1885.
Fumagalli (1890) 118-19 (outline.)
System with 17 main classes (given by Fumagalli). Dates from 1825 but minutely subdivided (history, *e. g.* 227 subdivisions) by Z.

1885. *System of Brownbill.*

BROWNBILL, John. Science and art: a theory of library classification.

In: Lib. Chron. 3 (1886) 133-136.

I., Theology; II., Moral sciences (incl. Language, Philosophy, Sociology, History); III., Physical sciences; IV., Literature; V., Painting; VI., Music; cf. outline, p. 136.

1885. *System of Ogle.*

OGLE, J. J. Outline of a new scheme of classification applicable to books. In: Lib. Chron. 2 (1885) 161-166.

A. Word knowledge; B, Religious knowledge; C, Social knowledge; D, Mind knowledge; E, Art knowledge (Literary); F, Art knowledge (Non-Literary); G, Nature knowledge (Non-Biological); H, Nature knowledge (Biological); J, Industrial knowledge; K, General knowledge.

1886. *System of the Cologne Public Library.*

KEYSSER (Adolph.) Die Stadtbibliothek in Köln. Ihre organization und verwaltung, Beiträge zu ihrer geschichte. Köln, 1886. (Veröffentlichungen der Stadtbibliothek in Köln, 1 Heft.)

Fumagalli (1890) 112 (gives 14 classes (A-O). There are 311 sub-classes. Under each subdivision strict accessions orders without regard to size.)

1886. *System of the Sion College Library.*

MILMAN, W. H. Order of the classification of Sion College Library, London. Lond., R. Clay & Sons, 1886, 54 p.; also in: Lib. Chron. 3 (1886) 183 (outline.)

Dewey Classification at Sion College. The Library 8 (1896) 350-375 (outline.)

Brown (1898) 71-3 (outline.)

The system is a nominal Dewey much adjusted.

1886. *System of the Frankfurt City Library.*

SYSTEMATISCHE eintheilung der Stadtbibliothek zur Frankfurt am Main, 1886.

Fumagalli (1890) 115-6 (250 main classes in 14 main classes (given by Fum.) Abbreviation notation.)

1888. *System of the "Bibliothèque Cardinal."*

CATALOGUE méthodique et raisonné. Paris, 1888, 8°.

Maire (1896) 248 (outline.)

1888. *System of Bodleian Library.*

THE BODLEIAN LIBRARY in 1882-7. A report from the Librarian (Edward B. Nicholson) published by permission of the Curators Oxford, Dec., 1888.
Fumagalli (1890) 108-10.

1888. *System of Frati.*

FRATI, Luigi. Opere della bibliografia bolognese che si conservano nella biblioteca municipale di Bologna classificate. Bologna, 1888, v. 2.
Fumagalli (1890) 97-8.

The published vol. contains class 6 of the Bologna Municipal Library. It has 59 sub-classes, which are in turn greatly subdivided. The remaining 5 main classes, (1) Sacra, (2) Storica, (3) Letteraria, (4) Scientifica, (5) Artistica, have 227 subdivisions. The notation seems to refer to a fixed location, and is made up of first an Arabic numeral, then a letter, then a Roman numeral, and finally another Arabic numeral (thus, 2 a iv. 3).

1888. *System of Hartwig.*

[HARTWIG, Otto.] Schema des realkatalogs der Königlichen Universitätsbibliothek zu Halle a. S. Leipzig, 1888, p. 350, 8°. (Beihefte zum Centralblatt für Bibliothekswesen III.)
Fumagalli (1890) 116-17; Gräsel (1890) 153 (outline); Brown (1898) 57-9 (outline.)

A, Book sciences and General works; B, Universal Philology and Oriental languages; C, Classical Philology; D. Modern Philology; E, Fine Arts; F, Philosophy; G, Pedagogy; H, Culture history and universal Science of Religion; I, Thelogy; K, Jurisprudence; L, Political science; M, Auxiliary historical sciences; N, History; O. Geography; P, General works of Natural Science and Mathematical sciences; Q, Physics and Meteorology; R, Chemistry; S, Natural sciences; T, Agriculture, Forestry, Technology; U, Medicine.

This Hartwig or Halle system is noteworthy for the excellent logic of its subdivisions, although, as a universal system, the minute subdivision of law is disproportionate. The notation is very intricate, and one would think almost impracticable for libraries.

1889. *System of Fletcher.*

FLETCHER, W. I. Public libraries in America. Bost., 1894, 12°; Library classification, Bost., 1894, 32 p. 8°.

Fletcher, W. I. Library classification theory and practice III. In: Lib. J. 14 (1889) 113-16 (full outline.)

The Library 6 (1894) 157 (Rev. of "Library Classification," 1894, outline.) The Library 9 (1897) 206 (outline.) Library Journal 14 (1889) 244-5 (Bliss); Brown (1898) 80-82 (outline.)

Fiction; Juvenile; 1-13. English and American literature; 15-75. History; 81-2. Biography; 85-120. Voyages and Travels; 125-172. Science; 179-240. Useful arts; 245-277. Fine arts; 279-350. Political and Social; 352-416. Philosophy and Religion; 421-456. Language and literature; 461-8. Reference books.

This is of medium expansion, and is intended to be very simple and untechnical. It is not intended to come in competion with the more thorough and scientific systems.

1889. *System of the Strassburg University Library.*

Fumagalli (1890) 122 (Direct communication.)

12 main classes (given by Fumagalli), about 600 subdivisions. Example of notation "Eb, xlii., Italienisch" form and no.

1889. *System for the Public Libraries of France.*

Bulletin des bibliothèques (1889) 113-183.

Fumagalli (1890) 104-6.

22 classes, A-V, each divided into four sizes; each series either (1) by the order of Brunet, or (2) alphabetically, or (3) in the case of history, chronologically. Fum. thinks this author is rather doctrinaire than practical, but gives the brief outline.

1890. *System of Delisle.*

DELISLE, Léopold. Instructions elémentaires et techniques pour la mise et le maintien en ordre des livres d'une bibliothèque. Lille, 1890, 8°, p. 7, sq.

Maire (1896) 220-3 (outline.)

1890. *System of Grassauer (Vienna University Library.)*

Fumagalli (1890) 123 (Direct information.) 99 main classes.

1890. *System of the Imperial Library of St. Petersburg.*

Fumagalli (1890) 125. (18 main classes. "In the individual classes the books are arranged with sole regard to the size of the volumes.")

1890. *System of the Swedish Public Libraries.*

SVERIGES offentliga bibliotek Stockholm. Upsala. Lund. Göteborg. Accessions-Katalog no. 4 par Dahlgren. Stockholm, 1890, 8°. Maire (1896) 220 (outline.)

1890. *System of Bonazzi.*

BONAZZI, G. Schema di catalogo systematico per le biblioteche. Parma, 1890, 110 p. 8°. Bliss, R. Bonazzi's scheme for a classed catalogue, Lib. J. 16 (1891) 5-8; 19 (1894) c 69 (outline); Brown (1898) 59 (outline.)

Outline.

A, General works; B, Ethnic religions, mythology, etc.; C. Christian religion; D, Jurisprudence; E, Sociology; F, Philology; G, Literature; H, Philosophy; I, Science, physical and mathematical; K, Chemistry; L, Natural science; M, Medicine; N, Surgery; O, Pharmacy; P, Veterinary science; Q, Agriculture; R, Industry and manufactures; S, Fine arts; T, Music; U, Recreative arts, sport, theatre; V, Geography; W, Voyages and travels; X, Archæology; Y, Biography; Z, History.

1891. *System of Sonnenschein.*

SONNENSCHEIN. The best books. 2d ed. Lond., 1891, 4°; also A reader's guide. Suppl. to the Best books. Lond., 1895, 4°. Maire (1896) 218 (outline); Brown (1898) 54-7 (outline). A, Theology; B, Mythology and Folklore; C, Philosophy; D, Society; E, Geography, Ethnology, Travel and Topography; F, History; G, Archælogy; H, Science and Medicine; I, Arts and Trades; K, Literature and Philology. Eleven main classes, 122 sub-classes and 1221 divisions, each of which is usually split up into from two to a dozen or more subjects variously arranged. It is the best example of modern bibliographical (as distinguished from bibliothecal) classification.

1891. *System of G. W. Harris.*

HARRIS, G. W. The classification of the Cornell University Library. Lib. Jour. 16 (1891) 138-9.
Lib. Jour. 19 (1894) c 69 (Nelson. Outline); Kephart. Classification (1895) 872 (outline.)

1891. *System of Teubner.*

TEUBNER. Verlags-Katalog, 1824-91, 8°.
Maire (1896) 216-7 (outline.)

1892. *System of Ottino.*

OTTINO. Giuseppi. Manuale di bibliografia. Milano, 1892, 16°, p. 138-9.

1894. *System of Rowell.*

ROWELL, J. C. Classification of books in the library. Berkeley, Cal., 1894, 49 p. 8°. (Univ. of Cal. Lib. bulletin no. 12.)
Kephart. Classification (1895) 880 (outline); Cutter, C. A., in: Lib. J. 20 (1895) 214-5.

Outline.

A Bibliography.
B Dictionaries.
C Periodicals.
1-15 Philosophy.
16-51 Religion.
52 Biography.
54 Geography.
54-255 Geography and history.
256-287 Politics; administration.
289-296 Law.
300 Social science.
315-332 Economics.
333 Science.
337-356 Mathematics.
357-371 Astronomy.
372 Physics; mechanics.
401 Civil engineering.
425 Natural history.
431 Geology.

440 Paleontology.
442 Botany.
461 Zoology.
480 Medicine.
506 Industrial arts.
507 Agriculture.
523 Chemistry.
536 Chemical techonology.
554 Mining.
580 Manufactures.
590 Building arts.
600 Architecture.
610 Domestic economy.
613 Recreation.
617 Business.
623 Art of war.
640 Esthetics.
Fine arts.
999 Languages and literature.

One of the best combinations of the scientific and practical in medium expansion among modern systems. The notation is, however, the rather discredited integral system.

1894. *System of Quinn-Brown.*

QUINN, J. H., & Brown, J. B. Classification of books for libraries in which readers are allowed access to the shelves. The Library 7 (1895) 75-82.
Wire, Geo. E., in: Lib. J. 23 (1898) c 19 (outline); Brown (1898) 59-61 (outline.)

1895. *System of the Vienna Royal Library.*

WIEN, *K. K.* Hofbibliothek. Instructionen für die Katalogs Arbeiten. 1 Heft. 1895.
Wire, Geo. E., in: Lib. J. 23 (1898) c 19 ("6 p. and full subject index.")

1896. *System of the French Institute.*

Bibliothèque de l'Institut.
Maire (1896) 229-30 (outline.)

1896. *System of French Lycees.*

Bibliothèques des Lycées (Proposed.)
Maire (1896) 246-8 (outline.)

1896. *System of the Paris Museum of Natural History.*

Bibliothèque du Muséum d'histoire Naturelle. Maire (1896) 231-3 (outline.)

1896. *System of the Paris Free Libraries.*

Bibliothèques populaires de Paris (Proposed system.)
Maire (1896) 245-6 (outline.)

1896. *System of the Paris City Library.*

Bibliothèque de la ville de Paris (Musée Casnavalet.)
Maire (1896) 235-44 (outline.)

1896. *System of the Paris Municipal Library.*

Bibliothèque administrative de la ville de Paris (Hotel de Ville.)
Maire (1896) 233-4 (outline.)

1898. *System of Brown.*

BROWN, James D. Manual of Library classification and shelf arrangement. Lond., 1898, 12°, p. 97-160.

Brown's adjustable classification, 1896, 641. (Reprint from Manual.)

Wire, G. E. Review of (Brown's) Manual of Classification. In: Lib. J. 24 (1899) 121 (outline.)

A, Science; B, Useful arts; C, Fine arts and Recreative arts; D, Social science; E, Philosophy and Religion; F, History and Geography; G, Biography and Correspondence; H, Language and literature; J, Poetry and the Drama; K, Prose fiction; L, Misc.

This system is quite different from and not to be confused with the Quiñn-Brown system of 1894. It is of the medium expansion and practical order, and belongs say between the systems of Rowell and Fletcher rather than with Dewey and Cutter. It is said to have

some vogue in England. The book as a whole is the best short monograph on library classification.

1898. *System of Dieserud.*

DIESERUD, J. Suggestions towards an improved decimal classification. In: Lib. J. 23 (1898) 607-9 (outline.)

1901. *System of the Princeton University Library.*

Location of books in the Library of Princeton University. Princeton, N. J., 1901, 12°.

Outline.

0000-0999. GENERAL WORKS.

0000 Miscellaneous.
0100 Book sciences general. Writing.
0200 Printing.
0300 Publishing and New book trade.
0400 Old book trade. Auction trade.
0500 Library science.
0600 History of libraries: Ancient and mediaeval, American, European.
0700 History of libraries: Asiatic, African, Australian, etc. Reading. Valuation and criticism. Best books. Universal bibliography.
0800 Public documents.
0900 General periodicals. Proceedings. Newspapers. Collections. Essays. Sources and history of learning. Eneyclopædias. Quotations and ana.

1000-1999. HISTORICAL SCIENCES.

1000 General geography, history, genealogy and biography. American history.
1100 American history, local, Alabama—New York.
1200 American history, local, New York—Wyoming. American heraldry, genealogy and biography. Canada and Newfoundland.
1300 Latin America: Mexico, Central America, West Indies, South America. Atlantic Ocean and islands.

1400 Europe, general. British Islands.
1500 Western and Central Europe.
1600 Northern and Eastern Europe. Mediterranean.
1700. Asia.
1800 Africa. Indian Ocean.
1900 Australasia. Melanesia. Pacific Ocean. Polar regions.

2000-2999. LANGUAGE AND LITERATURE.

2000 General. Artificial, primitive and independent languages.
2100 Dravidian, Malayo-Polynesian and Hamitic languages.
2200 General Orientalia. Semitic languages.
2300 Indo-European languages.
2400 New Indian. Avestan. Persian. Armenian.
2500 Classical languages general. Greek authors, general, and Achilles Tatius to Aristoteles.
2600 Greek authors: Aristoxenus—Longus.
2700 Greek authors: Lucianus—Zosimus. Modern Greek and Albanian literature.
2800 Latin authors, general, and Accius—Pervigilium Veneris.
2900 Latin authors: Petronius—Vitruvius. Modern Latin writers. Literary history. Mythology. History. Geography. Chronology. Metrology. Antiquities. Biography.

3000-3999. MODERN LANGUAGES AND LITERATURE.

3000 General. Slavonic. Celtic.
3100 Romance.
3200 French.
3300 Teutonic.
3400 German.
3500 Anglo-Saxon. English, general.
3600 English, single authors: A'Becket—Cross.
3700 Cross—James.
3800 James—Price.
3900 Prime—Zangwill.

4000-4999. ARTS.

4000 Oratory.
4100 Theater.
4200 Games, sports and pastimes.
4300 Music, general, and History of Music in America—Germany.

4400 History of Music: Holland—Polar. Musical texts.
4500 Graphic arts.
4600 National art history. Prehistoric art. Ancient art.
4700 Greek and Roman, Christian, Byzantine, Mediæval and Romanesque art.
4800 Gothic, Mohammedan, XIV-XVIII century art.
4900 Modern art.

5000-5999. THEOLOGY.

5000 General. Comparative, Primitive, Chinese, Indo-European, Egyptian, Jewish and Mohammedan religions. Natural theology and philosophical religions.
5100 Biblical philology, general. Texts and translations.
5200 Commentaries and literature of special books.
5300 Biblical geography, history, biography, theology, philosophy, science and antiquities.
5400 Church history, general. Missions, general.
5500 National church history and biography.
5600 Denominational history.
5700 Systematic theology, general. Apologetics. Polemics. Irenics. Dogmatics.
5800 Christian ethics. Experiential theology. Devotional theology. Ascetics.
5900 Practical theology. Polity. Law. Ministerial theology. Liturgics. Homiletics. Catechetics. Polemics. Evangelistics.

6000-6999. PHILOSOPHY AND EDUCATION.

6000 Philosophy, general and metaphysical, ancient, modern—British.
6100 British—Belgian.
6200 Scandinavian—. Reality. Knowledge (including Epistemology and Logic.)
6300 Ethics.
6400 Psychology.
6500 Education, general.
6600 History of education: ancient, mediæval, modern American; Alabama—New York.
6700 New York—Atlantic islands.

6800 European.
6900 Asiatic, African, etc.

7000-7999. SOCIOLOGY.

7000 Sociology, general. Relationships. Associations. Customs and classes. Crime, charities and correction.
7100 Economics, general. Production and consumption. Land and improvements. Labor. Capital.
7200 Population. Property. Exchange. Credit and banking. Circulation aind transportation (commerce).
7300 Distribution, general. Rent. Labor and wages. Capital. Insurance.
7400 Public finance. Socialism.
7500 Politics.
7600 Jurisprudence, general. Roman law.
American, general.
7700 Local law America: Alabama—North Carolina.
7800 North Dakota—Wyoming. Other local to Great Britain.
7900 France—Polar regions.

8000-8999. NATURAL SCIENCES.

8000 General: museums. Scientific travels, general.
8100 Mathematics.
8200 Physics.
8300 Chemistry.
8400 Astronomy.
8500 Physical Geography. Meteorology. Mineralogy. Geology. Palæontology.
8600 Biology, general. Evolution. General fauna and flora.
8700 Botany.
8800 Zoology.
8900 Anthropology. Hygiene. Medicine.

9000-9999. TECHNOLOGY.

9000 General. Exhibitions. History. Patents and inventions. Applied mathematics and physics. Metrology. Navigation. Geodesy and surveying.
9100 Building, general. Materials. Building. Tunnels. Bridges, roads and railroads. Ships, etc. Hydraulic engineering. Sanitary engineering.

9200 Mechanical (power) engineering, general. Tools. Production. Transmission. Forms: gravity, human, animal, water, air, heat and explosives, electricity.
9300 Mining and metallurgy.
9400 Agriculture.
9500 Horticulture. Arboriculture (forestry.)
9600 Animal culture (breeding) and Pisciculture (including fisheries).
9700 Manufactures.
9800 Chemical trades and industries.
9900 Social arts, general. Domestic, social, commercial, public (military and naval).

This Princeton University Library system is worth giving here to illustrate the difference between the practical and theoretical. This may be done by comparing it with the final outline under the theoretical systems, which is its philosophical basis. The notation is decimal with a four figure base, the author having started with the observation that many of the modern systems include some 10,000 or more subdivisions. It observes the mnemonic features to a greater or less extent, but not as far as might perhaps have profitably been done. It was constructed rather as a system for a special library than as a general system, but is perhaps not wholly without usefulness for libraries of similar character.

Random Examples of the Princeton Notation.

1150.114 Adams, C. F. Massachusetts.
9134.114 Adams, Henry. Structural iron-work.
2429.2898 Avesta. Zend-Avesta; tr. Darmesteter. 1898.
6547.438 Hauschmann. Kindergarten system.

1904. (1901 sq.) *System of the Library of Congress.*

Library of Congress. Classification. Outline scheme of classes. Preliminary. Dec. 1909. Wash. 1910, 4°. (The full schedules of each class are published separately, elaborately indexed, as completed—a large share of them have already (1911) been issued. An earlier outline was issued in 1904, and separate sections began to be issued as early as 1901.)

A—General Works—Polygraphy.

Includes: AC Collections, Series, Collected works; AE Encyclopedias; AG General reference works; AI Indexes; AM Museums; AN Newspapers; AP Periodicals; AS Societies,

Academies; AY Yearbook, Almanacs; AZ General history of knowledge and learning.

B—Philosophy—Religion.

Includes: B Collections, History, Systems; BC Logic; BD Metaphysics, Treatises, Theory of knowledge, Teleology; BF Psychology; BH Esthetics; BJ Ethics, Religion, Theology; BL Religions, Mythology, Cults, Theology; BM Generalities; BN Historical; BQ Exegetical; BS Systematic; BV Practical.

C—History—Auxiliary Sciences.

Includes: CA Philosophy of history in D 1.67, D 16.8, D 16.9; CB History of civilization (NB. General and General special only.); CC Antiquities, General; CD Archives, Diplomatics; CE Chronology; CJ Numismatics; CN Epigraphy, Inscriptions; CR Heraldry; CS Genealogy; CT Biography (General).

D—History and Topography (Except America).

Includes: D General history; DA British history; DB Austria-Hungary; DC France; DD Germany; DE Classical antiquity; DF Greece; DG Italy; DH Belgium and Holland; DJ Holland; DK Russia, General; DL Scandinavia, General; DP Spain and Portugal; DQ Switzerland; DR Turkey and the Balkan states; DS Asia; DT Africa; DU Australia and Oceania.

E—America.

Includes: America (General) and United States (General).

F—America.

Includes: United States (Local) and America outside of U. S.

G—Geography—Anthropology.

Includes: G Geography, voyages, travel (General); GA Mathematical and astronomical geography; GB Physical geography; GC Oceanology and oceanography; GD Biogeography; GF Anthropogeography; GN Anthropology, Somatology, Ethnology, Ethnography (General), Prehistoric Archeology; GR Folklore; GT Culture and civilization. Manners and customs; GV Sports and amusements. Games.

H—Social Sciences.

Includes: H Social sciences, General; Ha Statistics; ECONOMICS HB Economic theory; HC Economic history (National production.); HD Economic history; HE Transportation and communication; HF Commerce; HG Finance; HJ Public finance; SOCIOLOGY HM Sociology, General; HN Social history, Social reform; HQ Social groups, family, marriage, woman; HS Associations, Secret societies, clubs, etc.; HT Communities (and

classes); HV Social pathology, Philanthropy, Charities and corrections; HX Socialism, Communism, Anarchism.

J—Political Science.

Includes: J Documents; JA General works; JC Theory of the State; CONSTITUTIONAL HISTORY, AND ADMINISTRATION JF General; JK United States; JL Other American States; JN Europe; JQ Asia, Africa, Australia, and Pacific Islands; JS Local government; JV Colonies and colonization, Emigration and immigration; JX international law.

K—Law.

Includes: K.

L—Education.

Includes: L General works, form divisions; LA History of education; LB Theory and practice; LC Special forms; LDsq. Universities and colleges.

M—Music.

Includes: M Music; ML Music literature; MT Theory.

N—Fine Arts.

Includes: N General; NA Architecture; NB Sculpture and related arts; NC Graphic arts in general; ND Painting; NE Engraving; NF Photography (in art). See TR; NK Art applied to industry.

P—Language and Literature.

Includes: P Philology, Linguistics; PA Classical philology; PB Modern European languages, General works; PC Romance languages; PD Teutonic languages; PE English; PF Frisian, Dutch, German; PG Slavic languages, Lithuanian, Lettish; PH Finnish, Hungarian, Albanian, Basque; PJ General works, Hamitic, Semitic; PK Indo-Iranian; PL Language of Eastern Asia, Oceania, Africa; PM Hyperborean languages, American languages; PN-PV LITERARY HISTORY. LITERATURE; PZ Fiction.

Q—Science.

Includes: Q Science, General; QA Mathematics; QB Astronomy; QC Physics; QD Chemistry; QE Geology; QH Natural history; QK Botany; QL Zoology; QM Human anatomy; QP Physiology; QR Bacteriology.

R—Medicine.

Includes: R Medicine, General; RA State medicine; RB Pathology; RC Practice of medicine; RD Surgery; RE Ophthalmology; RF Otology, Rhinology, Laryngology; RG Gynecology and obstetrics; RJ Pediatrics; RK Dentistry; RL Dermatology; RM Therapeutics; RS Pharmacy and materia medica; RT Nurs-

ing; RV Botanic, Thomsonian and eclectic medicine; RX Homeopathy; RZ Miscellaneous schools and arts.

S—Agriculture—Plant and Animal Industry.

Includes: S General agriculture; SB General plant culture; SD Forestry; SF Animal husbandry, Veterinary medicine; SH Fish culture and fisheries, Angling; SK Hunting, Game protection.

T—Technology.

Includes: T Technology, General; ENGINEERING AND BUILDING GROUP, TA Engineering-General, Civil engineering; TC Hydraulic engineering; TD Sanitary and municipal engineering; TE Roads and pavements; TF Railroads; TG Bridges and roofs; TH Building construction; MECHANICAL GROUP, TJ Mechanical engineering; TK Electrical engineering and industries; TL Motor vehicles, Cycles, Aeronautics; CHEMICAL GROUP, TN Mineral industries; TP Chemical technology; TR Photography; COMPOSITE GROUP, TS Manufactures; TT Trades; TX Demestic science.

U—Military Science.

Includes: U General; UA Armies; UB Administration; UC Maintenance and transportation; UD Infantry; UE Cavalry; UF Artillery; UG Military engineering; UH Minor services.

V—Naval Science.

Includes: V Naval science, General; VA Navies. Organization and distribution; VB Administration; VC Maintenance: VD Seamen; VE Marines; VF Ordnance; VG Minor services; VK Navigation; VM Ship-building and marine engineering.

Z—Bibliography and Library Science.

Includes: 40-115 Writing; 116-550 Book industries and trade; 551-657 Copyright and intellectual property; 665-997 Libraries; 999-1000 Booksellers' catalogues, book prices; 1001-9000 Bibliography.

This very full system is being prepared with great care and skill by extremely competent hands and will, when finished and unified, make a formidable rival to the Brussels system for closeness of classification and fulness of index. It gains over the Brussels or the latest expansion of the Dewey in its freedom from some of the old categories, but it is doubtful if the mixed letter and whole number system of notation will suit the average librarian as well as the decimal systems or Brown's method of mixing letters and decimals. Its high scientific qualities and thoroughness with its excellent indexing (which in itself would make a much worse system of notation workable) to-

gether with the practical considerations which arise from the Library of Congress card printing work, will probably result in a large use of this system when finished.

1905. *System of the Brussels Institut.*

Institut International de Bibliographie. Manuel du repertoire bibliographique universal: Organisation—État des travaux—Règles —Classifications. OII.I (021). Brussels, 1905. 8°. Publication no. 63.

Hopwood, Henry V. Dewey expanded. Libr. Assoc. Record 9. 1907. S. 307-322, also repr. Lib. J. 32 (1907) 362-7.

This colossal work of some two thousand pages is the most extended of all printed systems. Founded on the Dewey decimal system, it is often, but as Mr. Hopwood has shown, somewhat misleadingly, called the "Expanded Dewey". Its relation is, however, close enough for it to be of great help to those who use the Dewey system, while, in itself, it forms a system in which close classification carried to its extreme is reduced to practical terms and it is likely to be a good deal used. It was originally issued in parts 1899-1905. It is a monument to the energy, enthusiasm, intelligence, industry and perseverance of MM. LaFontaine and Otlet.

Attention was called in connection with the Brussels conference in 1910, to the value that this system will have in interpreting other systems of classification. The history of its many applications and variations may be followed in the excellent *Bulletin* of the Institut. It hardly needs to be said that the importance of this system is out of all proportion to the space given in this account. It is not only the most extensive, but the most important (if the standard Dewey is excepted), the only other work in the same class being the unfinished Library of Congress system.

1906. *System of Brown. (Subject classification.)*

Brown, James Duff. Subject classification. Lond. 1906, p. 423, 8°.

Brown, James Duff. The small library. A guide to the collection and care of books. Lond. 1907, 16°. pp. 84-8.

Brown, James Duff. Manual of library economy. Rev. ed. Lond. 1907. 8°, pp. 199-202.

A. Generalia.

A0. Generalia.

A1. Education.

A3. Logic.
A4. Mathematics.
A6. Graphic Arts.
A9. General Science.
B, C, D. Physical Science.
B0. Physics.
C0. Electricity.
C1. Optics.
C2. Heat.
C3. Acoustics.
C8. Astronomy.
D0. Physiography.
D3. Geology.
D7. Chemistry.
E, F. Biological Science.
E0. Biology.
E1. Botany.
F0. Zoology.
G, H. Ethnology and Medicine.
G0. Ethnology.
I. Economic Biology, Domestic Arts.
J, K. Philosophy and Religion.
J0. Metaphysics.
J1. Esthetics, Psychology.
J2. Ethics.
J3. Philosophy.
J4. Theology.
L. Social and Political Science.
L0. Social Science.
L1. Political Economy.
L2. Government.
L4. Law.
L8. Commerce and Trade.
M. Language and Literature.
M0. Language.
M1. Literature.
M7. Palaeography, Bibliography.
N. Literary Forms.
N0. Fiction.
N1. Poetry.
N2. Drama.
N3. Essay and Miscellanea.
O-W. History and Geography.

O0. Universal History.
O1. Archaeology.
O2. Universal Geography.
O3. Africa.
P. Oceania and Asia.
P 0. Oceania and Australasia.
P29. Asia.
Q, R. Europe (South, Latin, etc.).
S, T. Europe (North, Teutonic, Slavonic.).
U, V. British Islands.
W. America.
X. Biography.

This new system of Brown is described as a greatly extended version of the system of 1898, known as the Adjustable Classification, but in reality it is quite a new system, based on the author's considerable experience, facing positively towards the customs of practical usage, printed in a type and manner which most admirably sets forth the matter for actual use, provided with various tables and an excellent complete index. Its preliminary rules, instructions, and exposition are models of practical exposition. The basis of notation is the single letter with decimal subdivisions—certainly one of the simplest and most practical, applied possibly with too much contempt for the value of mnemonic divisions, but with great simplicity. Altogether the book represents more completely than any other the ideal methodological presentation of a system. The brief outline given above hardly does justice to the relative importance of this system, but the simple method of notation is not one which lends itself readily to giving a brief outline without very considerable enlargement. Moreover, two such outlines are accessible in the 1907 edition of Brown's Manual of Library Economy (pp. 199-202), and in his "Small Library", 1907, (pp. 84-88) from which this outline is taken, the black-faced headings only being given.

1910. *System of Bliss.*

Bliss, Henry E. A modern classification of libraries, with simple notation, mnemonics, and alternatives. Libr. Journal 35 (1910) 351-358. [The following outline is modified from the Lib. J. outline, from notes furnished by the author.]

(1)

GENERAL SYNOPSIS.

General Science and Philosophy.

History of Science.
History of Philosophy.
First Principles.
Metaphysics.
Epistemology.
Logic.
Mathematics.
Natural Sciences.
Physical Sciences.
Metrology.
Polytechnics.
Physics.
Mechanics.
Kinematics.
Dynamics.
Sound, Acoustics.
Applied Mechanics.
Engineering.
Hydraulics.
Pneumatics, Aeronautics.
Matter and Aether Physics. . . ...
Chemistry and Chemical Technology.
Cosmic Natural Sciences.
Astronomy.
Natural History.
Geology.
Physical Geology.
Physical Geography.
Local Geography.
Meteorology.
Mineralogy.
Economic Geology.
Biological Sciences.
Biology.
Cytology.
Physiology.
Morphology.
Botany.
Zoology.
Anthropological Sciences.
Physical Anthropology and the Medical Sciences.
Psychology.
Education

Culture Anthropology (Ethnology).
Ethnography.
Folk-Lore.
Religion and Theology.
Mythology.
Religions.
Hebrew Religion.
Christian Religion and Theology.
Ecclesiastical History.
Christian Churches, Sects, Missions.
Historical Studies in General.
History.
Accessory Sciences.
Political Geography.
Travels.
Archeology and Antiquities.
Heraldry and Genealogy.
Biography.
Chronology.
General History. Historiography.
Main Eras.
Ancient.
Modern.
Europe, General.
Medieval.
Modern.
Military: Wars, etc.
Nations, Severally.
America.
North America.
Colonial.
United States.
British America.
Central and South America.
Africa, Asia and Australia.
Social Sciences.
Sociology.
Philanthropy.
Ethics.
Political Science.
Jurisprudence. Law.
Economics.

Arts.
  Useful and Industrial Arts.
  Recreative Arts, Amusements.
  Fine Arts.

Philology.
  General Linguistics.
    Comparative Philology.
  Special Linguistic Studies.
  Non-Aryan Languages.
    Semitic Languages.
  Indo-European Languages and Literature Severally.
  Rhetoric and Oratory in General.
  Literature in General.
    History of Forms of Literature.

(II)

NUMERICAL CLASSES.

1. Reference Library. Reading-room.
2. Bibliography.
   Books about books.
3. Select Library.
   For Reading-room or other separate room.
4. Special or Branch Libraries.
   College or University Departmental Libraries.
5. Miscellaneous.
   Polygraphy, Collections, Miscellanies.
   Ana, Rarities, Collections of Prints, Photographs, Manuscripts, Autographs, etc., unless preferred under the classes or subjects.
6. Periodicals, General.
7. 7. Societies', Institutions' Publications.
8. Local Collection.
   Or other special collection.
9. Antiquated Books, or Discarded Books.

   Those which are t obe stored apart. Others which are of historic value or which may be used occasionally may be marked with a 9 at the end of the class-mark and located near the used books on the subject.

MAIN CLASSES.

A. General Science and Philosophy.
Science in General, History of Philosophy, Metaphysics, Logic, Mathematics, Metrology, and Physical Sciences in General.
B. Physics.
Including Applied Mechanics, Engineering, and related technologies.
C. Chemistry, and Chemical Technology.
D. Astronomy.
E. Geology.
Including Physical Geography, Meteorology, Mineralogy, and Economic Geology.
F. Biology.
G. Botany.
H. Zoology.
I. Physical Anthropology and the Medical Sciences.
J. Psychology, and Education.
K. Culture Anthropology.
Ethnology, Ethnography, Folk-Lore.
L. Religion and Religions.
M. History: Accessory Sciences, General History, and Ancient History.
N. Europe, Medieval and Modern.
O. America.
P. Africa, Asia, and Australasia, etc.
Q. Social Sciences
Sociology, Philanthropy, Ethics.
R. Political Science.
S. Jurisprudence and Law.
T. Economics.
U. Useful and Industrial Arts.
Recreative Arts. Pastimes.
V. Fine Arts.
W. Philology.
General Linguistics, Non-Aryan and Unclassified Languages, Semitic Languages.
X. Indo-European Languages and Literatures Severally.
Y. English Language and Literature.
Z. Alternative for Theology and Religion.

This newest of the carefully worked out systems comprises both

a theoretical and a practical statement and might perhaps be separated into the two but the theoretical outline is so distinctly the explanatory basis of the practical, rather than an independent theory that they are given together; even the theoretical introduction is obviously shaped more or less by practical library considerations. It is probably quite within limits to say that this system represents the freest adjustment of subjects to the results of modern science of any of the modern systems.

NOTE.—For keeping up to date on the library systems see any of the library periodicals and the various indexes to periodical articles. Up to the date of this reprint *Cannon's* gives complete orientations. For keeping up from year to year, the most excellent annual of Hortzschansky, published as Beiheft of the *Zentralblatt f. Bibliothekswesen* will be found a sufficient guide.

VI. SYSTEMS OF CURRENT BIBLIOGRAPHICAL PERIODICALS.

These systems, representing as they do the most familiar classification usage of the present time, cannot well be neglected by the student of classification. Conditions of space forbid giving the outlines in detail here, but they are most of them readily accessible, and quite a number of outlines are given in Maire. Some of those oftenest met are the following:

BIBLIOGRAFIA ITALIANA *See* Bolletino delle pubb. ital.

BIBLIOGRAPHIE DE BELGIQUE. Journal officiel de la Librarie. Bruxelles, Table systematique.
Maire (1896) 210 (outline.)

BIBLIOGRAPHIE DE LA FRANCE. Journal général de l'Imprimerie et de la librairie. Paris. [Not the same as the system of 1812.]
Rouveyre (1882) 59-63 (detailed outline); Maire (1896 211-12 (outline.)

BOLLETINO DELLE PUBBLICAZIONE ITALIANA. [Each number is classified. See also the annual summary for 1901. Feb. 2, p. vi. The Bolletino is in general identical with the "Bibliografia italiana."]

THE BOOKSELLER. A newspaper of British and foreign literature. Lond.
Maire (1896) 213 (outline Alphabetical subjects.)

BOOKSELLER NEWSDEALER AND STATIONER. New York. [Annual summary. For 1900, Feb. 1, 1901, p. 583.]

BÖRSENBLATT, F. DEN DEUTSCHEN BUCHHANDEL . . . Leipzig.
Maire (1896) 212 (outline.)

BROCKHAUS' ALLGEMEINE BIBLIOGRAPHIE MONATL. VERZ. Leipzig.

HINRICHS, J. C. Verzeichness. Leipzig. [The weekly nos. and half-yearly v. table represent substantially the same system.] Maire (1896) 212 (outline.

NEDERLANDSCHE BIBLIOGRAPHIE. The Hague.

POLYBIBLION. Revue bibliographique universelle. Paris. Maire (1896) 209.

THE PUBLISHERS' CIRCULAR. London. [Annual summary. For 1900, Jan. 5, 1901, p. 10.]

THE PUBLISHERS' WEEKLY. New York. [Annual summary. For 1900, Jan. 26, 1901, p. 79-89.]

REINWALD, C. BULLETIN MENSUEL DE LA LIBRAIRE FRANCAISE. Paris.

REVUE BIBLIOGRAPHIQUE BELGE. Bruxelles.

VII. PARTIAL SYSTEMS OF CLASSIFICATION.

It would be vain to attempt to give any comprehensive survey of the enormous number of partial classifications, but this account would be incomplete if attention were not called to the fact of the existence of these and to the great advantage that they may be in the preparation of a general system. A large number of the best modern partial classifications are enlargements of some section of the Dewey classification. This is true of Vermorel's minute and well indexed classification of agriculture, the system of the Bibliographia Medica, of the Zoological classification of the Zurich Index and many others. To this class also is to be credited the new schedules for science, with the decimal notation, which have been prepared for the Royal Society, Baldwin's admirable system in the Journal of Psychology, etc. If we may regard the sub-portions of the Cutter seventh expansion as partial systems, then we must qualify the above by adding that these considerable fragments are among the very best. And indeed there are numberless others which have no particular reference to any current system.

VIII. SYSTEMS OF ALPHABETICAL CLASSIFICATION.

The strict alphabetical classification by subjects demands a word in conclusion. While by no means a new idea, it is in its comprehensive application to books a distinctly modern development. The alphabetical arrangement by authors has been of course the common bibliographical arrangement for a long time, although even this is far from being as old as the chronological or logical classification. The alphabetical by subjects has existed too for a long time in every

index and in many dictionaries of authors and places. In its general application to books it belongs to the latter half of the 19th century, and the most distinctive use of it in these latter days is in the so-called dictionary catalog, now the favorite form in libraries and very generally used in booksellers' catalogs and works of general bibliography. This form, which runs authors and subjects into one alphabet, has some of its best known examples in the catalogs of the Boston Athenæum, the Brooklyn and Peabody libraries.

Other familiar examples are the American Catalogue (subject portion), the various indexes to periodicals and essays such as the A. L. A. Index, Poole, Jones' Index to Legal Periodicals, The Review of Reviews Index, Jordell in France, Dietrich in Germany, etc., etc. It is the general form of the periodical index, although the Zurich index and the proposed general index to scientific periodicals of the Royal Society are intended to be classed logically, and in general most of the special branch indexes are so classified. Every dictionary encyclopædia is practically such an outline of alphabetical classification, but almost the only system of schedules intended purely for this purpose is the A. L. A. "List of subject headings." This is, in the strictest sense of the term, an example of a system of alphabetical classification by subjects, the most popular and most unscientific of systems, the joy of the general reader, the despair of the specialist, an invaluable system as supplement or index to the system of logical classification, a futile and embarrassing system when the object is exhaustive research and this is the exclusive classification.

INDEX